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10 IN THE UNITED STATES DISTRICT COURT  
11 FOR THE WESTERN DISTRICT OF WASHINGTON  
12 AT SEATTLE

13 BRENT LOGAN, an individual, )  
14 Plaintiff, ) Civil Action No.  
15 THE BABYPLUS COMPANY, an Indiana ) COMPLAINT FOR PATENT  
16 limited liability company, and LISA JARRETT, ) INFRINGEMENT, TRADEMARK  
17 an individual, ) INFRINGEMENT, UNFAIR  
18 Defendants. ) COMPETITION, BREACH OF  
19 ) CONTRACT, AND DECLARATION  
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3. Upon information and belief, Defendant The BabyPlus Company is an Indiana limited liability company with a principal place of business at 9750 Olympia Drive, Fishers, Indiana 46037.

4. Upon information and belief, Defendant Lisa Jarrett is an individual and resident of the State of Indiana. Upon information and belief, Defendant Lisa Jarrett is the principal owner and manager of The BabyPlus Company and directed and controlled and/or had the opportunity to direct and control the activities complained of herein. The BabyPlus Company and Lisa Jarrett are referred to collectively herein as "Defendants."

## **JURISDICTION AND VENUE**

5. This action arises under the Patent Act, 35 U.S.C. § 271 *et seq.*, the Lanham Act, 15 U.S.C. § 1051 *et seq.*, and the law of the State of Washington. The Court has subject matter jurisdiction pursuant to 15 U.S.C. § 1121, 28 U.S.C. §§ 1331 and 1338, as well as 28 U.S.C. § 1367(a), which provides for supplemental jurisdiction over related state-law claims.

6. Venue in this judicial district is proper under 28 U.S.C. §§ 1391(b), (c) and/or 1400(b) in that Defendants have done business in this district, have committed and continued to commit acts of patent infringement and trademark infringement in this district, and a substantial part of the events giving rise to Dr. Logan's claims occurred in this district. The actions of Defendants occurring in this district were expressly aimed at this judicial district and at Dr. Logan, and Defendants took such actions with knowledge of Dr. Logan's location in Washington State and of Dr. Logan's asserted patent and trademark rights.

## FACTS

7. Dr. Logan is a developmental psychologist who has worked for many years and become well-known in the field of fetal learning and prenatal enrichment.

8. Dr. Logan developed a prenatal and postnatal enrichment program and system (“Dr. Logan’s Work”) for increasing cognitive function, including software, hardware and a

1 manuscript of instructional and operating documentation relating to his program and system  
2 together with a related website.

3 9. On December 17, 2002, the U.S. Patent and Trademark Office issued United  
4 States Design Patent No. 6,494,719 (hereinafter "the '719 patent"), entitled "Method and  
5 System for Reproducing a Progressive or Regressive Pattern of Sonic Variations." Dr. Logan  
6 is the named inventor and sole owner of the '719 patent, a copy of which is attached hereto as  
7 Exhibit A. The '719 patent is valid, enforceable, and subsisting.

8 10. On April 11, 2006, the U.S. Patent and Trademark Office issued United States  
9 Design Patent No. 7,025,594 (hereinafter "the '594 patent"), entitled "Method and System for  
10 Reproducing a Progressive or Regressive Pattern of Sonic Variations." Dr. Logan is the named  
11 inventor and sole owner of the '594 patent, a copy of which is attached hereto as Exhibit B.  
12 The '594 patent is valid, enforceable, and subsisting.

13 11. As early as July 26, 1995, Dr. Logan began using the mark BABYPLUS in  
14 connection with the sale and marketing of sound equipment for early learning, namely,  
15 personal sound generators and related acoustic speakers and carrying cases. Dr. Logan applied  
16 for and received U.S. Trademark Registration No. 2449736 for his BABYPLUS mark in  
17 International Class 9 for "sound equipment for early learning, namely, personal sound  
18 generators for audio transmission of patterned tones or music, the alphabet, and rhythms,  
19 acoustic speakers for use therewith, and carrying cases fitted exclusively for personal sound  
20 generators." A copy of the certificate of registration is attached hereto as Exhibit C.

21 12. On or about June 28, 2000, Dr. Logan and Defendants entered into a License  
22 Agreement, effective July 28, 2000, whereby Dr. Logan licensed Defendants to manufacture,  
23 market and distribute Dr. Logan's Work, granting Defendants an exclusive license to Dr.  
24 Logan's '719 and '594 patents, BABYPLUS trademark, and other intellectual property  
25 associated with Dr. Logan's Work.

1       13. On or about July 27-28, 2007, Dr. Logan and Defendants entered into a First  
 2 Amended License and Assignment Agreement (“2007 Agreement”), effective August 1, 2007,  
 3 whereby Dr. Logan granted Defendants an exclusive license to manufacture, market and  
 4 distribute Dr. Logan’s Work on the terms and conditions of the agreement, including an  
 5 exclusive right and license under Dr. Logan’s ’719 and ’594 patents, “and any copyrights, trade  
 6 secrets, know-how or other intellectual property rights of Logan associated with the Work” as  
 7 set forth in paragraph 3.1 of the 2007 Agreement. The 2007 Agreement further provided that  
 8 Dr. Logan would assign his BABYPLUS trademark to Defendants, subject to the terms of the  
 9 agreement, which required Defendants to make ongoing payments to Dr. Logan, and, *inter alia*,  
 10 that in the event of termination of the Agreement, rights granted to Defendants would revert to  
 11 Dr. Logan. A copy of the 2007 Agreement is attached hereto as Exhibit D.

12       14. Paragraph 8.3 of the 2007 Agreement provided that in the event of a material  
 13 breach of the agreement by either party that continued, without waiver or cure, for ninety days  
 14 after written notice to the breaching party, the Agreement would be terminated.

15       15. Pursuant to Paragraphs 4-2 through 4-5 of the 2007 Agreement, Defendants  
 16 were required to pay a minimum royalty and sales royalties to Dr. Logan during the “royalty  
 17 term” as defined in the agreement.

18       16. Commencing in approximately October 2008, Defendants failed to make timely  
 19 royalty payments as required under the 2007 Agreement and have made none of the required  
 20 minimum payments for the period from April 1, 2009 through September 14, 2009.

21       17. On June 10, 2009, Dr. Logan gave Defendants written notice of Defendant’s  
 22 breach of the Agreement in a letter from Dr. Logan’s counsel sent via Federal Express. A copy  
 23 of the written notice is attached hereto as Exhibit E. In that letter, Dr. Logan notified  
 24 Defendants of their failure to pay the minimum royalties and sales royalties and to provide the  
 25 summary report required under the terms of the Agreement. Defendants were required to cure  
 26

the breach within ninety (90) days – i.e., by September 8, 2009, extended by mutual agreement to September 14, 2009 – to avoid termination of the 2007 Agreement.

18. Defendant failed to make the required payments and cure its breach of the Agreement by the September 14, 2000 deadline and the 2007 Agreement was terminated. Defendants acknowledged the termination of the Agreement in a letter to Dr. Logan's counsel dated September 29, 2009.

19. Upon termination of the 2007 Agreement and their failure to make payments due thereunder, Defendants forfeited all rights under the license granted to them by Dr. Logan, including rights to the BABYPLUS mark, and are no longer authorized manufacture, market or distribute Dr. Logan's Work or any other product that falls within the claims of Dr. Logan's patents.

## **FIRST COUNT**

**PATENT INFRINGEMENT UNDER  
35 U.S.C. § 271 *et seq.***

20. Dr. Logan repeats and realleges each of the allegations contained in paragraphs 1 through 19 of this Complaint as if fully set forth herein.

21. Defendants are infringing one or more claims of the '719 patent by making, using, offering to sell, and/or selling BabyPlus product in this district and elsewhere in the United States.

22. Defendants are infringing one or more claims of the '594 patent by making, using, offering to sell, and/or selling BabyPlus product in this district and elsewhere in the United States.

23. Defendants have continued to manufacture, market and sell the BabyPlus product, despite being on notice and acknowledging that their licenses had been terminated and that Dr. Logan is the sole owner of the patents and retained all rights to the patented invention, and they have continued to offer and sell the infringing product in this judicial district and

1 elsewhere. Copies of pages printed from Defendants' website at [www.babyplus.com](http://www.babyplus.com) are  
 2 attached hereto as Exhibit F.

3 24. Upon information and belief, Defendants' infringement has been willful.

4 25. Dr. Logan has been, and will continue to be, damaged by such infringement in  
 5 an amount to be proven at trial and in a manner and amount that cannot be fully measured or  
 6 compensated in economic terms and for which there is no adequate remedy at law. The actions  
 7 of Defendants have damaged, and will continue to damage, Dr. Logan's business, market,  
 8 reputation, and goodwill unless the acts of Defendants complained of herein are enjoined.

9 **SECOND COUNT**

10 **TRADEMARK INFRINGEMENT AND UNFAIR COMPETITION**  
 11 **UNDER THE LANHAM ACT**

12 26. Dr. Logan realleges and incorporates by reference the allegations of Paragraphs  
 13 through 25 of the Complaint as though fully set forth herein.

14 27. Upon termination of the 2007 Agreement, Dr. Logan became and is now the  
 15 rightful owner of the BABYPLUS mark and any valid rights in U.S. Trademark Registration  
 16 Nos. 2449736 and 3414436 for that mark.

17 28. Although Defendants no longer own the BABYPLUS mark and are not licensed  
 18 or authorized to use the mark, Defendants have continued to market and sell products in  
 19 connection with Dr. Logan's BABYPLUS mark.

20 29. Defendants' use of the BABYPLUS mark constitutes trademark infringement,  
 21 false designation of origin, false or misleading description, and/or false or misleading  
 22 representation. Such use of Dr. Logan's BABYPLUS mark is likely to cause confusion or  
 23 mistake or to deceive others as to the affiliation, connection, or association of Defendants with  
 24 Dr. Logan and vice versa. It is likely to deceive or confuse others into believing that  
 25 Defendants' products are sponsored by, approved by, or affiliated with Dr. Logan.

30. Such false designation, description, and/or representation constitute unfair competition and are an infringement of Dr. Logan's rights in his BABYPLUS mark and in violation of Section 43(a) of the Lanham Act, 15 U.S.C. Sections 1117 and 1125(a).

31. Despite actual and/or constructive knowledge of Dr. Logan's rights, Defendants are continuing their acts of infringement.

32. Dr. Logan has been, and will continue to be, damaged by Defendants' past and continuing false description, false representation, false designation of origin, and other acts of unfair competition in a manner and amount that cannot be fully measured or compensated in economic terms. Defendants' actions have damaged, and will continue to damage, Dr. Logan's market, reputation, and goodwill, and may discourage current and potential customers from dealing with Dr. Logan. Such irreparable harm will continue unless Defendants' acts are restrained and/or enjoined.

33. Dr. Logan has been damaged by Defendants' actions in an amount to be proven at trial.

### **THIRD COUNT**

## **BREACH OF CONTRACT**

34. Dr. Logan hereby reincorporates the allegations of Paragraphs 1 through 33 above as if set forth fully herein.

35. Dr. Logan has performed all obligations required of him under the 2007 Agreement.

36. Defendants have materially breached the Agreement by failing to pay the required minimum and sales royalty payments.

37. Dr. Logan has duly and timely provided Defendants written notice of Defendants' material breach of the Agreement.

38. Defendants have failed to cure their breach

39. By reason of Defendants' breach of the 2007 Agreement, Dr. Logan has been damaged by Defendants' failure to pay royalties totaling \$42,274.99, plus interest as provided under RCW 19.52.010 and *Prier v. Refrigeration Engineering Co.*, 74 Wash.2d 25, 442 P.2d 621 (1968), and such further amounts to be determined at trial including costs incurred by Dr. Logan in attempting to collect amounts due from Defendants.

## **FOURTH COUNT**

## **DECLARATORY OF OWNERSHIP**

40. Dr. Logan hereby repeats and realleges the allegations set forth in paragraphs 1 through 39 of this complaint.

41. A dispute has now arisen between the parties, and an actual and justiciable controversy exists concerning Defendants' breach of the 2007 Agreement and the appropriate remedy therefor.

42. Dr. Logan requests a declaration and judicial determination by this Court of the parties' respective rights and obligations under the Agreement. In particular, Dr. Logan requests a declaration and judicial determination that Defendants have forfeited all previously assigned rights in the BABYPLUS mark by reason of the termination of the 2007 Agreement.

43. Dr. Logan further requests a declaration and judicial determination that he is the rightful owner of the BABYPLUS mark and that Defendants are required to assign to him all right, title and interest in U.S. Trademark Registration Nos. 2449736 and 3414436 for the BABYPLUS mark.

## PRAYER FOR RELIEF

WHEREFORE, Dr. Logan respectfully demands judgment as follows:

1        On the First Count for Patent Infringement

2        1.        That Defendants, their officers, directors, agents, servants, employees, attorneys, confederates, affiliates, and all persons acting for, with, by, through, or under it or any of them be preliminarily and permanently enjoined from:

5                (a)        Infringing the '719 patent, either directly, or contributorily; and  
6                (b)        Infringing the '594 patent, either directly, or contributorily.

7        2.        That Defendants be required to recover from their distributors and retail customers all infringing products and all promotional literature illustrating or referring to the infringing products.

10        3.        That Defendants be required to deliver up to the Court the following items in Defendants' possession, custody or control: any and all products which infringe the '719 patent and all documents or information used to produce such infringing products.

13        4.        That Defendants be required to deliver up to the Court the following items in Defendants' possession, custody or control: any and all products which infringe the '594 patent and all documents or information used to produce such infringing products.

16        5.        That Defendants be required to prepare and deliver to the Court a complete list of entities to whom Defendants distributed or sold infringing products together with any and all documents reflecting or relating to the purchase or sale of such infringing products.

19        6.        That Defendants, within fifteen (15) days after service of judgment, with notice of entry thereof upon it, be required to file with the Court and serve upon Dr. Logan's counsel a written report under oath setting forth in detail the manner in which Defendants have complied with the injunction.

23        7.        That Defendants account for and pay over to Dr. Logan damages sustained by Dr. Logan by reason of Defendant's unlawful acts of patent infringement herein alleged, together with pre-judgment and post-judgment interest, and that the amount of recovery be increased under 35 U.S.C. § 284 or as otherwise provided by law.

1       8.     That Defendants account for and pay over to Dr. Logan the profits sustained by  
 2 Defendant by reason of its unlawful acts of patent infringement herein alleged as provided by  
 3 35 U.S.C. § 289 or as otherwise provided by law.

4       9.     That Defendants' infringement of Dr. Logan's patents be found willful and that  
 5 treble damages, together with interest and costs, be awarded under 35 U.S.C. § 284 or as  
 6 otherwise provided by law.

7       10.    That the present case be found exceptional and that attorneys' fees be awarded  
 8 to Dr. Logan under 35 U.S.C. § 285 or as otherwise permitted by law.

9 On the Second Count for Trademark Infringement and Unfair Competition

10      11.    That Defendants, their affiliates, officers, agents, servants, employees, attorneys,  
 11 and all other persons in active concert or participation with any of them, be preliminarily and  
 12 permanently enjoined and restrained from using the BABYPLUS mark or any other  
 13 confusingly similar mark, trade name or domain name.

14      12.    That Defendants, their affiliates, officers, agents, servants, employees, attorneys,  
 15 and all other persons in active concert or participation with any of them, be preliminarily and  
 16 permanently enjoined and restrained from all acts of false description and representation and  
 17 false designation of origin, and all acts of unfair competition, including the use of the  
 18 BABYPLUS mark or any other confusingly similar mark, trade name or domain name.

19      13.    That Defendants, their affiliates, officers, agents, servants, employees, attorneys,  
 20 and all other persons in active concert or participation with any of them, be preliminarily and  
 21 permanently enjoined and restrained from all manufacture, marketing, promotion, promotion,  
 22 sale, and use of any products, packaging, advertising, labels, or other sales or shipping material  
 23 that infringe Dr. Logan's BABYPLUS mark, including retail web sites and web pages and  
 24 advertisements.

25      14.    That Defendants, their affiliates, officers, agents, servants, employees, attorneys,  
 26 and all other persons in active concert or participation with any of them, be ordered to deliver

1 to all products, packaging, advertising, labels, or other sales or shipping material in their  
 2 possession or control to Dr. Logan that infringe Dr. Logan's BABYPLUS mark, including  
 3 products, packaging, advertising, labels, or other sales, promotional or shipping material having  
 4 the BABYPLUS mark or any other confusingly similar mark.

5 15. That Defendants be directed to file with this Court and serve on Dr. Logan's  
 6 counsel within fifteen (15) days after the service of an injunction a report in writing, under  
 7 oath, setting forth in detail the manner and form in which Defendants, their affiliates, officers,  
 8 agents, servants, employees, attorneys, and all other persons in active concert or participation  
 9 with any of them have complied with the injunction.

10 16. That Defendants be required to pay Dr. Logan such damages as Dr. Logan has  
 11 sustained, or will sustain, in consequence of Defendants' false description and representation,  
 12 false designation of origin, unfair competition and trademark infringement, and to account for  
 13 all gains, profits, and advantages derived by Defendants that are attributable to such unlawful  
 14 acts, as provided by 15 U.S.C. Section 1117.

15 17. That Defendants be ordered to pay to Dr. Logan prejudgment and postjudgment  
 16 interest on all sums allowed by law.

17 On the Third Count for Breach of Contract

18 18. That Defendants be required to pay to Dr. Logan all damages sustained by  
 19 Dr. Logan as a consequence of Defendants' breach of the 2007 Agreement, including the  
 20 \$42,274.99 unpaid royalties plus interest thereon as provided by law, plus all costs incurred in  
 21 the collection of the sums due from Defendants.

22 On the Fourth Count for Declaratory Relief

23 19. That the Court declare that Defendants have forfeited all previously assigned  
 24 rights in the BABYPLUS mark by reason of the termination of the 2007 Agreement.

25 20. That the Court declare that Dr. Logan is the rightful owner of the BABYPLUS  
 26 mark and that Defendants are required to formally assign to Dr. Logan all right, title and

1 interest in U.S. Trademark Registration Nos. 2449736 and 3414436 for the BABYPLUS mark  
 2 and transfer to Dr. Logan the babyplus.com domain name.

3 On All Counts

4 21. That Defendants be ordered to pay to Dr. Logan his costs incurred in this action.  
 5 22. That Dr. Logan have such other and further relief as this Court may deem just  
 6 and proper.

7 **DEMAND FOR JURY TRIAL**

8 Dr. Logan demands a trial by jury as to all issues so triable.

9 DATED this 18<sup>th</sup> day of October, 2009.

10  
11 Respectfully submitted,

12 SEED IP Law Group PLLC

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# EXHIBIT A



US006494719B1

(12) **United States Patent**  
**Logan**

(10) **Patent No.:** **US 6,494,719 B1**  
(b5) **Date of Patent:** **Dec. 17, 2002**

(54) **METHOD AND SYSTEM FOR  
REPRODUCING A PROGRESSIVE OR  
REGRESSIVE PATTERN OF SONIC  
VARIATIONS**

(76) Inventor: **Brent E. Logan, P.O. Box 33948,  
Seattle, WA (US) 98133**

(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **09/421,659**

(22) Filed: **Oct. 20, 1999**

(51) Int. Cl.<sup>7</sup> ..... **G09B 23/28**

(52) U.S. Cl. ..... **434/262; 434/236; 224/664;  
600/26; 600/27; 600/28**

(58) Field of Search ..... **434/262, 236,  
434/319, 273; 224/664; 600/27, 28, 26,  
545; 381/151**

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\* cited by examiner

Primary Examiner—Joe H. Cheng

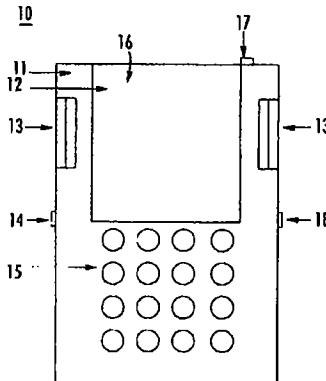
Assistant Examiner—Chanda Harris

(74) Attorney, Agent, or Firm—Mathews, Collins, Shepard & McKay, P.A.

(57) **ABSTRACT**

The present invention relates to a system and method for increasing the cognitive function in a fetus. The system transmits a pattern of sonic variations to the fetus. The pattern of sonic variations is formed of a plurality of sequences of tones in which each sequence is repeated at a predetermined tempo. Each sequence of tones is selected to be transmitted to the fetus at a predetermined time during the term of the pregnancy. Preferably, each subsequent sequence of tones is selected to be repeated at increasing tempo during the term of the pregnancy, thereby providing a progressive pattern of sonic variations. A similar system and method can be used for improving the cognitive function of a premature baby. In addition, the present invention relates to a system and method for altering the cognitive function in a postnatal human by transmitting aurally or through bone conduction a progressive pattern of sonic variations or a regressive pattern of sonic variations to the wearer of the system.

**25 Claims, 9 Drawing Sheets**



**COMPLAINT**

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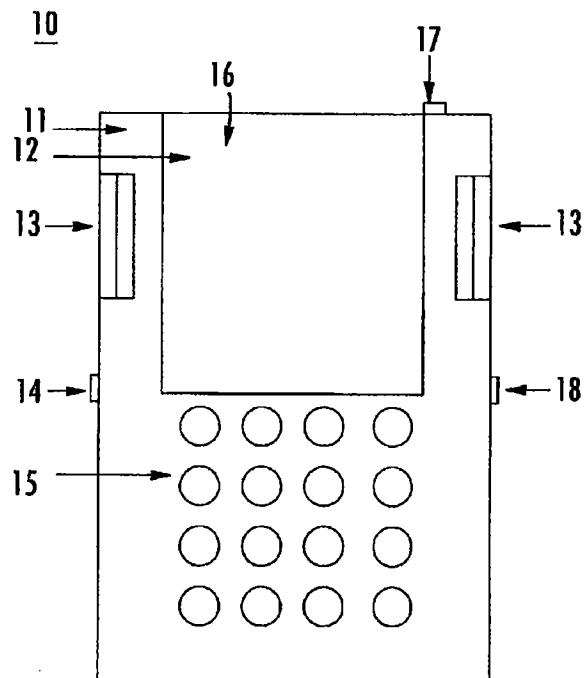


FIG. 1.

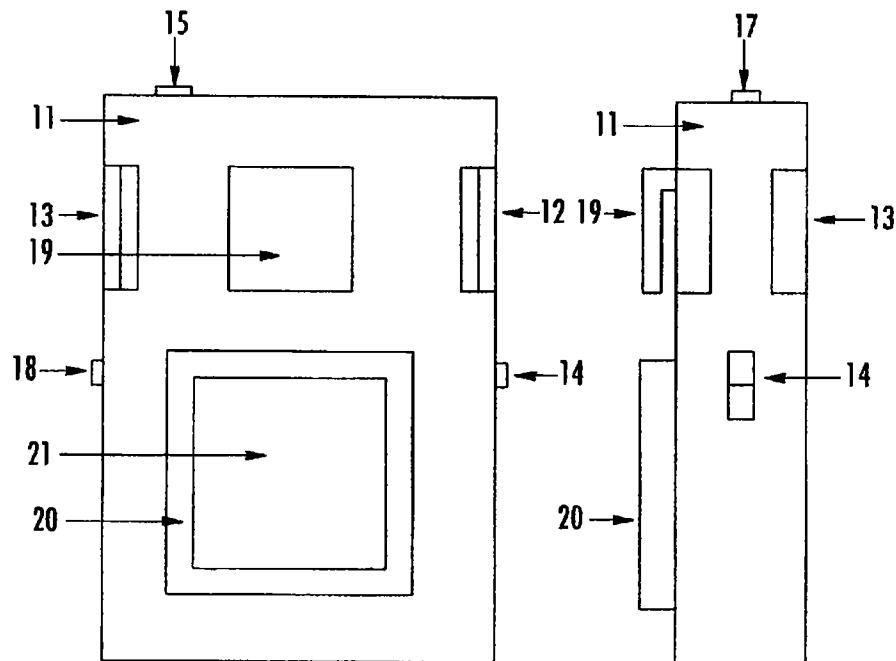


FIG. 2.

FIG. 3.

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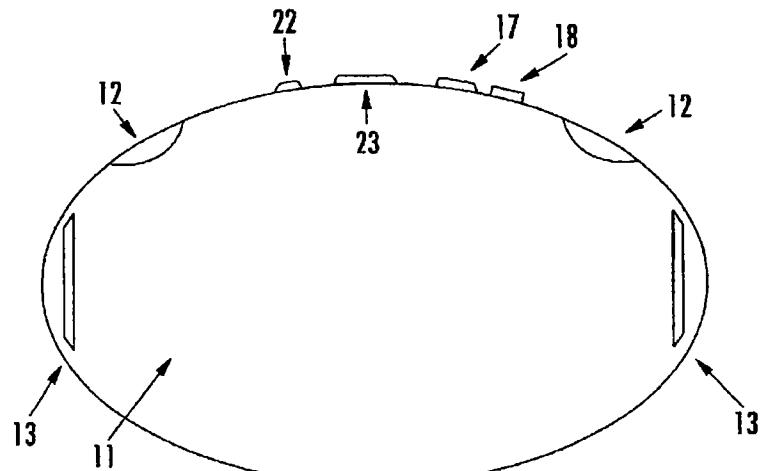


FIG. 4.

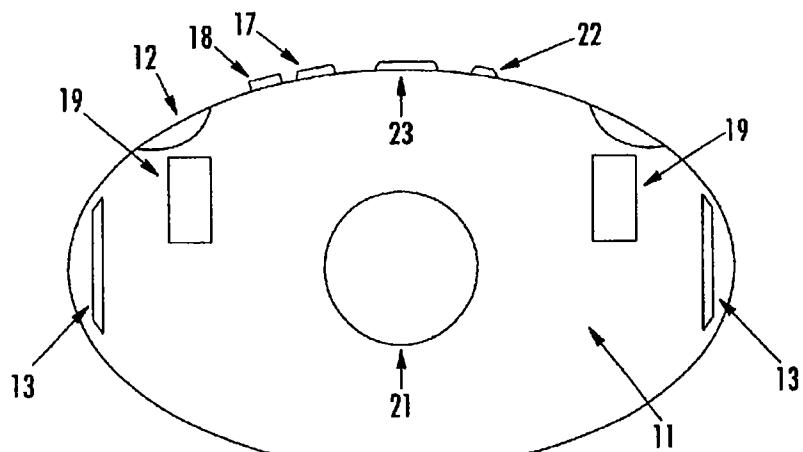


FIG. 5.

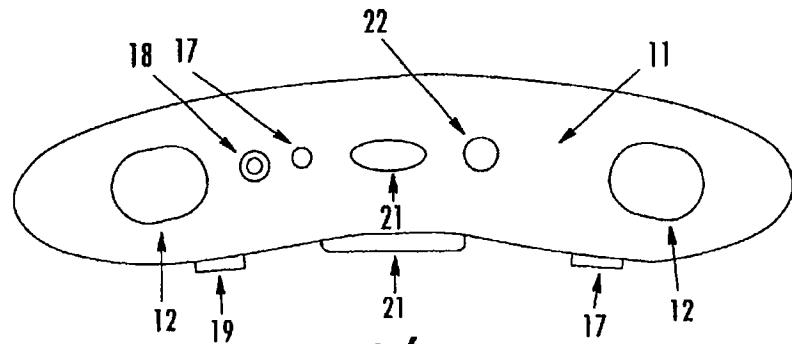


FIG. 6.

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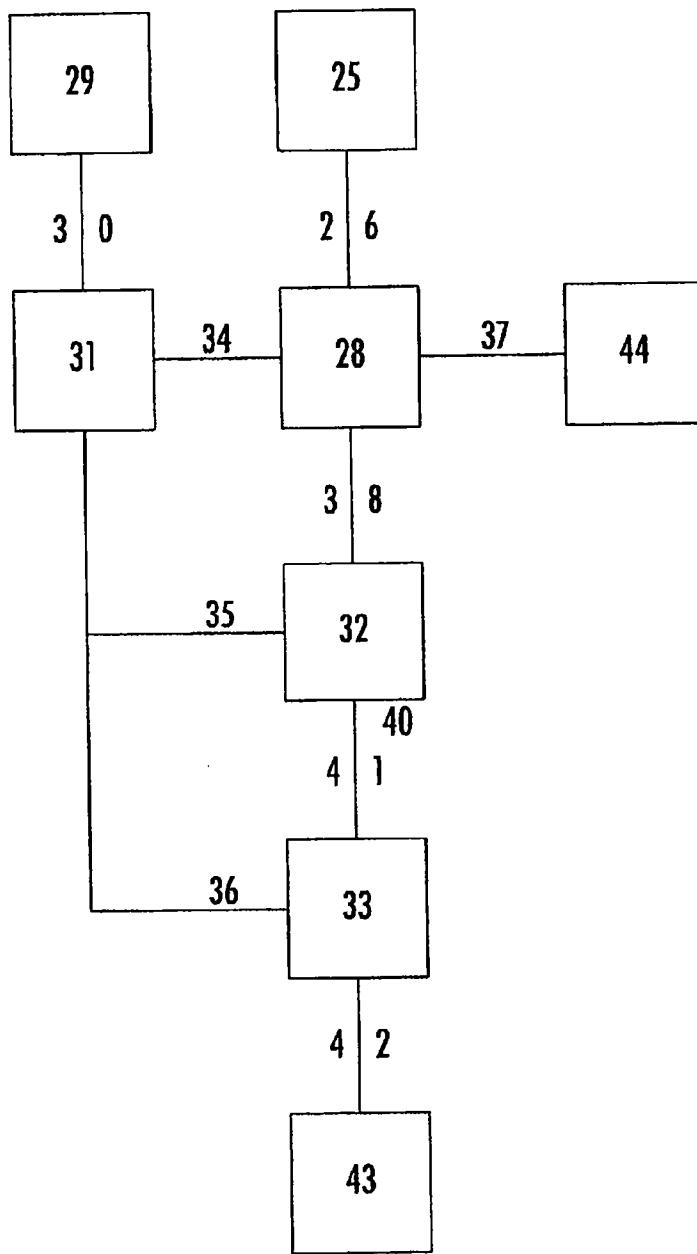


FIG. 7.

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16	NOTES	HERTZ	52
			1.00
50a	A	A	A
50b	A	A	C
50c	A	C	A
50d	A	A	C
50e	A	C	A
50f	A	C	C
50g	A	C	A
50h	A	A	C
50i	A	A	C
50j	A	A	C
50k	A	A	C
50l	A	A	C
50m	A	A	C
50n	A	C	E
50o	A	C	E
50p	A	C	E

FIG. 8A.

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FIG. 8B.



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## FIG. 8B(CONT).



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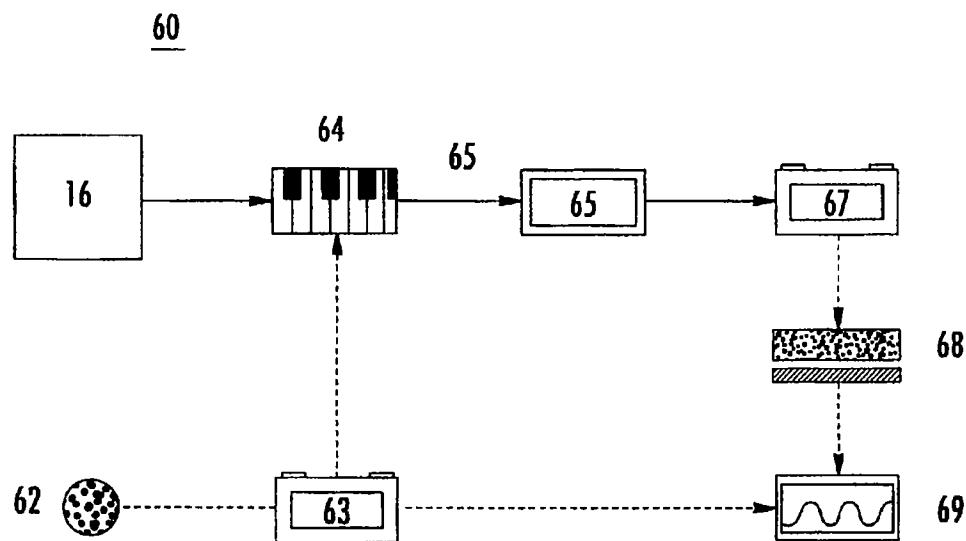


FIG. 9.

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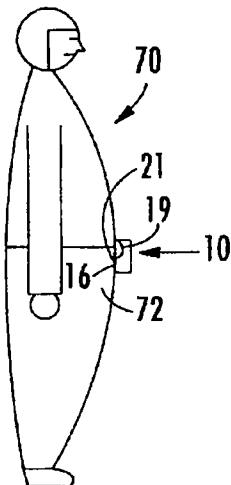


FIG. 10.

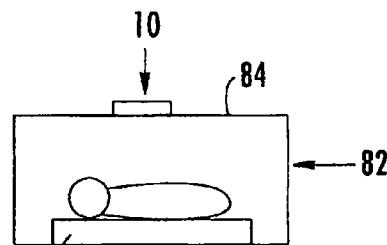


FIG. 11.

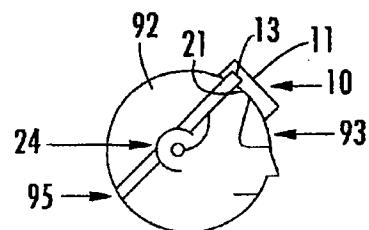


FIG. 12.

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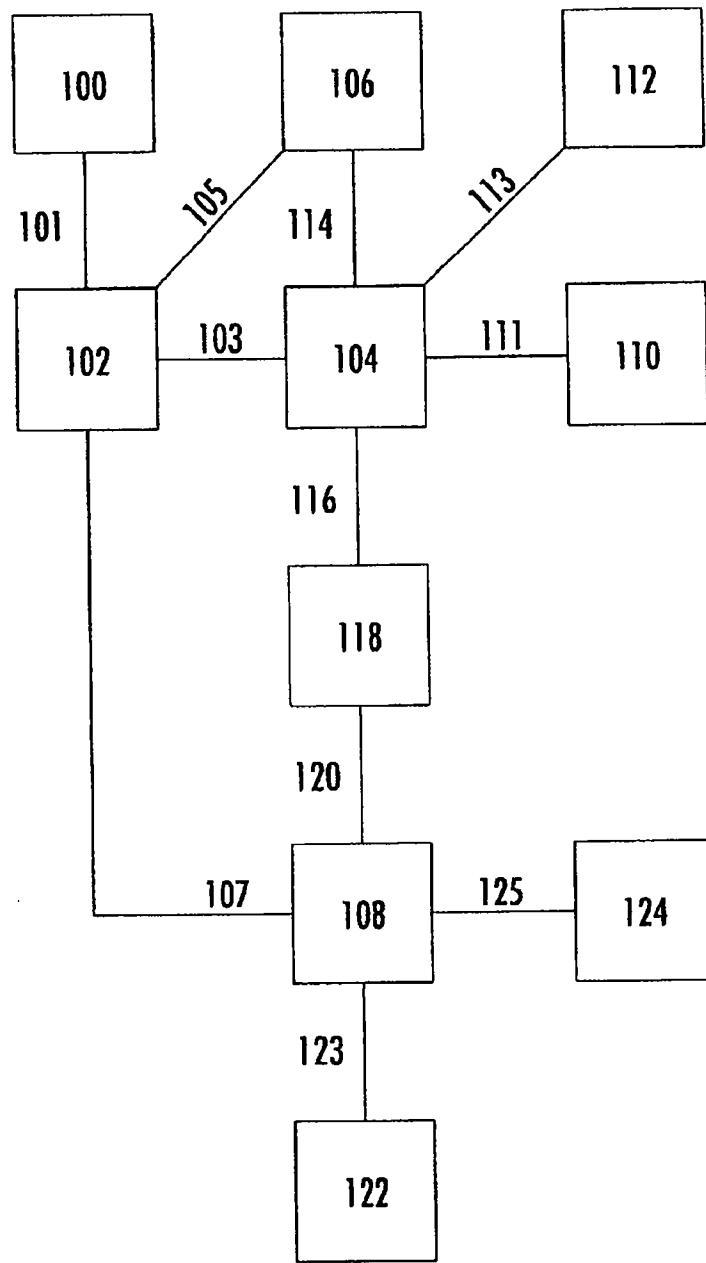


FIG. 13.

## US 6,494,719 B1

1

**METHOD AND SYSTEM FOR  
REPRODUCING A PROGRESSIVE OR  
REGRESSIVE PATTERN OF SONIC  
VARIATIONS**

## BACKGROUND OF THE INVENTION

## 1. Technical Field

The present invention relates to a method and system of reproducing a pattern of sound variations and applying the pattern to a human fetus, infant, child, adolescent or adult, with possible animal applications.

## 2. Description of the Related Art

Systems are known for transmitting external stimuli to the human fetus. U.S. Pat. No. 4,798,539 describes a method and system for systematically educating and communicating with a baby in its mother's womb. Educational messages or soothing messages are transmitted to the fetus. The messages can include, for example, soothing music, simple words or nursery rhymes.

U.S. Pat. No. 5,033,968 describes a method and apparatus for presenting voice or noise to a fetus in which the sounds more accurately resemble the same sounds as the baby will hear after birth. Recorded sounds are contoured and amplified. The sound range is in the 1000 to 2000 hertz range on the order of 90 to 95 decibels.

U.S. Pat. No. 5,491,756 discloses a system for delivering sound to a fetus through the mother's abdomen and which also allows monitoring of the effects of the sound on the fetal child. A sound generator, for example a radio or so called "walkman" unit, generates sound. The sound is applied by speakers located on a belt. The belt is juxtaposed to the abdomen in proximity of the fetal child. The sound can include soothing music or like sounds. A stethoscope is located in proximity to the fetal child to monitor the effects on the fetal child.

Mental performance in vertebrates is signified by electrical energy which can be monitored on the cranial surface with skin transducers producing an electroencephalogram (EEG). Such output is measured in cycles per second (hertz). An alpha rhythm relates to a human baseline indicating a state of relaxed wakefulness when the eyes are closed. Some analyses have shown alpha rates generally rise according to increased neural complexity on the evolutionary scale, from amphibia to Homo sapiens. Human alpha rhythm is attained by puberty in the range of 8-13 hertz, averaging 10 hertz, and diminishes only slightly with age.

Both prebirth and newborn alpha rhythms, referred to as protoalpha, have been found to be in the range of 1-2 hertz and the alpha rhythms increase incrementally until reaching the adult maximum of 10 hertz. Developmentally, it has been suggested that an alpha rhythm can be both a significant empirical indicator and predictor of reduced or amplified mental capacity. A child whose alpha rhythm is advanced beyond the norm may therefore have attained a more mature level of cognitive function than someone of similar age having a lower alpha rhythm.

It is desirable to provide a method and system for reproducing sonic variations in which the tempo and/or pitch of the variations can be altered to provide a predetermined pattern which can be applied to a wearer of the system in order to affect a desired increased cognitive function.

## SUMMARY OF THE INVENTION

The present invention relates to a system and method for increasing the cognitive function in a fetus. It has been found

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that a progressive pattern of sonic variations reproducing incrementally faster alpha rhythms at levels and formats appropriate to the prenatal stage which is repeatedly transmitted to the fetal child is advantageous in increasing cognitive function. The pattern of sonic variations is formed of a plurality of sequences of tones in which each sequence is repeated at a predetermined frequency. Each sequence of tones is selected to be transmitted to the fetus at a predetermined time during the term of the pregnancy. Preferably, each subsequent sequence of tones is selected to be repeated at increasing frequency during the term of the pregnancy, thereby providing a progressive pattern of sonic variations.

The method can include a determination of a maternal bloodpulse baseline as it occurs in utero. Tones in the pattern of sonic variations can be determined as the tone of the maternal bloodpulse baseline or tonal variations therefrom. The tonal variations can be selected to increase in subsequent sequences of tones.

A similar system and method can be used for improving the cognitive function of a premature baby. In addition, the present invention relates to a system and method for altering the cognitive function in a postnatal human being by transmitting aurally or through bone conduction a progressive pattern of sonic variations or a regressive pattern of sonic variations to the wearer of the system.

The invention will be more fully described by reference to the following drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic diagram of a front view of a system for reproducing sonic variations.

FIG. 2 is a schematic diagram of a rear view of the system.

FIG. 3 is a schematic diagram of a side view of the system.

FIG. 4 is a schematic diagram of a front view of an alternate embodiment of the system.

FIG. 5 is a schematic diagram of a rear view of the system shown in FIG. 4.

FIG. 6 is a schematic diagram of a front view of an alternate embodiment of the system.

FIG. 7 is a schematic diagram of electronic circuitry for the system.

FIG. 8A is a schematic diagram of a progressive sound pattern of sonic variations for use with the system.

FIG. 8B is musical notation of the progressive sonic pattern of sonic variations shown in FIG. 8A.

FIG. 9 is a schematic diagram of a method for obtaining an in utero sonic baseline and generating the pattern of sonic variations.

FIG. 10 is a schematic diagram of the system in a prenatal application.

FIG. 11 is a schematic diagram of the system in a premature baby application.

FIG. 12 is a schematic diagram of the system in a postnatal application.

FIG. 13 is a schematic diagram of alternative electronic circuitry for the system.

## DETAILED DESCRIPTION

Reference will now be made in greater detail to a preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings. Wherever possible, the same reference numerals will be used throughout the drawings and the description to refer to the same or like parts.

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FIGS. 1-3 illustrate a system for reproducing sonic variations 10 in accordance with the teachings of the present invention. Housing 11 includes power supply cover 12 for covering a power supply such as batteries (not shown). Housing 11 has a substantially rectangular or square shape. Openings 13 are formed in housing 11 for receiving a belt or band formed for example of elastic or fabric. On/Off switch 14 controls operation of power to system 10.

Program buttons 15 control selection of a plurality of patterns of sonic variations 16, as described in more detail below. For example, each of the sixteen program buttons 15 can be associated to access one of sixteen sequences of tones stored in system 10 which sequences form the pattern of sonic variations 16. For example, the pattern of sonic variations 16 can be stored on a microchip. Alternatively, a cassette or compact disc player can be used with system 10 to access patterns of sonic variations stored respectively on a cassette tape or compact disc or other removable storage media. Low power indicator light 17 indicates low power of the power supply. Jack opening 18 extends into housing 11 for receiving supplemental speakers or earphones (not shown). Earphones can be used to listen to the patterns of sonic vibrations being transmitted by system 10.

Apparel clip 19 extends from housing 11. Apparel clip 19 can be clipped to a waistband of a wearer of system 10. Sound proofing material 20 surrounds speaker face 21 for directionally focusing sound from system 10.

FIGS. 4 and 5 illustrate an alternative embodiment in which housing 11 has an elliptical or circular shape. Button 22 is used to access the pattern of sonic vibrations 16 stored in system 10. For example, button 22 can sequentially access each sequence of tones forming the pattern of sonic variations 16 in order to aid a wearer in sequentially selecting the sequence of tones to be transmitted to the fetal child. Liquid crystal display 23 is attached to housing 11. Liquid crystal display 23 provides viewing of the accessed sonic pattern of variations 16. FIG. 6 illustrates a top view of housing 11, which has a contoured shape for applying speaker face 21 to a curved shape such as an abdomen of a pregnant woman.

FIG. 7 illustrates a schematic circuit diagram of electronic circuitry for system 10. Selection switch 25 provides on/off contact and program selection through connection 26 to power and countercircuit input tabs of microchip 28. For example, microchip 28 can be an eighteen-pin digitally stored microchip. Power initiates as low voltage alternating current 29 and is converted through converter 30 to direct current for charging battery 31. Battery 31 provides power to microchip 28, voice synthesizer 32 and transducer driver 33 through connection 34, connection 35 and connection 36, respectively. The direct current is controlled by selection switch 25 through connection 34 and connection 37. When selection switch 25 is pressed, the signal passes through connection 37 to microchip 28. Microchip 28 generates pulse signals through connection 38 to voice synthesizer 32. Voice synthesizer 32 generates sonic signal 40 through connection 41 to transducer driver 33. Transducer 43 is driven by transducer driver 33 through connection 42. Timer circuit 44 produces a pulse through connection 45 when the timer counter overflows.

A pattern of sonic variations 16 is formed of a plurality of sequences of tones. For example, the pattern of sonic variations 16 can be formed of sixteen sequences of tones. Each sequence of tones is repeated at a predetermined tempo. Each sequence of tones can be a repetition of the same tone or a repetition of a pattern of tonal variations having different pitches. Each of the repeated sequences of

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tones is transmitted by system 10 for a predetermined period of time to a wearer of system 10. The period of time each repeated sequence is transmitted can be determined for various applications of system 10. For example, the period of time can be the term of pregnancy for a prenatal application or a period of weeks or months for a postnatal application.

A progressive pattern of sonic variations is defined as a pattern in which the tempo is increased at which each sequence in the pattern is repeated. A regressive pattern of sonic variations is a pattern in which the tempo is decreased at which each sequence in the pattern is repeated.

Operation of system 10 in a method for improving cognitive function of a fetus in utero is shown by the following example. The system is used for the auditory driving of alpha rhythm, and imprinting of the fetal child. FIG. 8A illustrates an example of a progressive pattern of sonic variations 16 for increasing the cognitive function of a human fetus in utero. In this example, a progressive pattern of sonic variations is formed of 16 sequences of tones represented in rows 50a-50p. The tone represented by "A" is a tone of an in utero baseline maternal bloodpulse, which will be described in more detail below. The tone represented by "C" is a tone which is two whole notes higher than the tone represented by "A". The tone represented by "E" is a tone which is two whole notes higher than the tone represented by "C". The sequence of tones are repeated and the repeated sequence of tones are transmitted for a particular duration, for example one hour. The tempo at which each of the sequences of tones in rows 50a-50p is transmitted to the fetus in utero is represented in column 52. Alternatively, increasing tonal variations can be used in each subsequent sequence with each sequence having the same tempo.

In this example, the frequency at which each sequence is transmitted is increased in first 0.25 hertz and then 0.50 hertz increments from the resting human heart rate of 1 hertz. In the progressive pattern of sonic variations in this example, each successive sequence of tones has a pattern of increased tonal variations from the maternal baseline tone so that the last pattern has the fewest tones of the maternal baseline represented by "A" and the most tonal variations represented by "C" and "E". In the method, each of the sequences of tones represented in rows 50a-50p is transmitted to the fetus during different periods within the term of pregnancy. For example, each sequence of tones can be played during a particular week of pregnancy. Accordingly, the first sequence represented by row 50a can be played for a length of time, i.e. one hour, a few times a day to the fetus in utero starting midterm of the pregnancy, i.e. the 24<sup>th</sup> week of pregnancy. It has been found that stimulation after the first trimester of pregnancy is advantageous since there is better developed fetal hearing. A second sequence represented by row 50b can be played the subsequent week of pregnancy, i.e. 25<sup>th</sup> week of pregnancy, and each subsequent sequence represented by rows 50c-50p is played during subsequent weeks of pregnancy until birth of the fetus at approximately 39.5 weeks. It has been found that application of the above-described method results in a higher alpha rhythm for the infant stimulated with system 10 than the alpha rhythm measured in infants not stimulated with system 10. It will be appreciated that the period of time for transmitting each sequence can be varied according to the time at which the method begins, i.e., if the method is initiated at the 30<sup>th</sup> week each of the sequences of tones represented by rows 50a-50p could be transmitted to the fetal child for approximately four days. Also, other progressive patterns of sonic variations having different increasing frequencies or tonal variations

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could be used to increase cognitive function in accordance with the teachings of the present invention.

FIG. 8B presents in standard musical notation the progressive pattern of sonic patterns shown in FIG. 8A of tones increasing in tempo from an alpha rhythm baseline and adding pitch variations of two and four whole notes from the baseline tone.

In alternate postnatal embodiments for offsetting under or overactive physical or psychological status, a progressive pattern of sonic variations in alpha rhythm or a regressive pattern of sonic variations in alpha rhythm can be transmitted to the individual over a treatment time period for accelerating or decelerating cortical alpha rhythms in the treated individual. The pattern of sonic variations permit users to achieve stimulatory or relaxant behavioral states by receiving transmissions as progressively or regressively sequenced audiovibratory frequencies, thereby adjusting alpha brainwave activity. In the concurrent absence of visual stimuli, the pattern of sonic variations increase or decrease the rates of cortical data processing by providing throughout the mental structure governing influences which promote like sinusoidal patterns. From auditory driving, these physiosonic impulses gradually move the existing cognitive mode toward its desired alternative over a selected period of time. Duration of the effect is dependent upon length of application, user psychodynamics, and subsequent environmental factors. The advantages of operation of system 10 for applying a selected progressive pattern of sonic variations to infants, children, adolescents, and adults are improving cognitive performance, overcoming tiredness, and mitigating depression. The advantages of operation of system 10 for applying a selected regressive pattern of sonic variations to infants, children, adolescents, and adults are reducing stress and hypertension, countering sleep disorders and calming hyperactivity. System 10 could also be altered for sonic and/or physical requirements of designated species for application to animals.

FIG. 9 illustrates a method for obtaining an in utero sonic baseline 60 and generating the baseline outside the defined pattern of sonic variations 16. Microphone 62 is inserted through the cervix to obtain a real-time in utero bloodpulse recording 63 of the womb's sounds. Microphone 62 can be a hydrophone or liquid-impervious microphone. Digital sampling system 64 permits progressive temporal sequences 65 to be derived from in utero bloodpulse recording 63. Adjustments in tone, pitch, and volume of digitally sampled progressions is performed in block 66 in order to compensate for abdominal tissue, fluid and bone attenuation and provide the progressive pattern of sonic variations 16. Preferably, the sound volume of the transmitted pattern of sonic variations 16 can be adjusted below that normally experienced in the womb yet sufficient for fetal discernment. The progressive pattern of sonic variations 16 is transmitted to a recipient fetus in utero with uterine transmission source 67. The progressive pattern of sonic variations 16 applied by uterine transmission source 67 is also filtered back through womb wall 68, real or simulated. Real-time analyzer 69 compares the received filtered baseline from womb wall 68 with that of uterine transmission source 67 for assuring fidelity of the progressive pattern of sonic variations to the in utero bloodpulse.

FIG. 10 shows prenatal use of system 10 positioned in proximity to an abdomen of woman 70 by means of apparel clip 19 attached to apparel 72 worn by woman 70. Speaker face 21 faces the fetus in utero for transmission of the pattern of sonic variations 16 to the cerebral cortex of the fetus.

FIG. 11 shows use of a system with a premature baby 80 by affixing system 10 to hospital incubator 82, thereby

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locating system 10 proximally to premature baby 80. The pattern of sonic variations 16 is transmitted through or from wall 84 to the cerebral cortex of premature baby 80.

FIG. 12 shows a postnatal application of system 10 in which speaker face 21 is positioned on cranial surface of human 92 for applying the pattern of sonic variations 16 to the cerebral cortex. Eye mask 93 can be placed over the wearer's eyes to block visual stimuli. Earphone 94 also provides aural transmission of the pattern of sonic variations 16 to human 92. Elastic or fabric belt or band 92 extends through openings 13 of housing 11 for positioning system 10 approximate to the cerebral cortex.

FIG. 13 illustrates an alternative circuit diagram of electronic circuitry for system 10. Battery 100 provides voltage to regulator 102 through connection 101. Regulator 102 provides power to microprocessor 104, memory device 106 and transducer driver 108 through connection 103, connection 105 and connection 107 respectively. Selection switch 110 provides program selection and power-up interrupt on input tab of microprocessor 104 through connection 111. For example, microprocessor 104 can be a forty-four-pin digitally stored microprocessor such as manufactured by Microchip as PIC16C64.

When interrupted by selection switch 110, microprocessor 104 displays the current file number on display 112 through connection 113. Further interrupts by selection switch 110 to microprocessor 104 select the next file number in sequence. When a file is selected, microprocessor 104 queries memory device 106 through connection 114 for the sound waveform information. Microprocessor 104 generates width modulated pulse signals through connection 116 to filter network 118. Filter network 118 converts the width modulated pulse signals into a voltage waveform. The voltage waveform is passed from the filter network 118 to the transducer driver 108 through connection 120. Transducer 122 and transducer 124 are driven by transducer driver 108 through connection 123 and connection 125 respectively.

It is to be understood that the above-described embodiments are illustrative of only a few of the many possible specific embodiments which can represent applications of the principles of the invention. Numerous and varied other arrangements can be readily devised in accordance with these principles by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

- 45 1. A method for improving cognitive function of a fetus in utero in a woman, comprising the steps of:
  - determining a pattern of sonic variations, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo; and
    - 50 transmitting each of said sequences of tones in soundwave form to said fetus during different periods within the term of pregnancy,
      - 55 wherein said tempo at which each subsequent said sequence of tones is repeated is selected to be increased during the term of pregnancy.
  2. The method of claim 1 further comprising the step of: determining an in utero maternal baseline tone;
    - 55 wherein each of said tones in said sequence of tones is said in utero maternal baseline tone.
  3. The method of claim 1 further comprising the step of: determining an in utero maternal baseline tone,
    - 60 wherein each of said tones in said baseline tone is said in utero maternal baseline tone or a tonal variation from said in utero maternal baseline tone.
  4. The method of claim 3 wherein at least one of said tonal variations is a tone which is two whole notes higher than said in utero maternal baseline tone.

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5. The method of claim 4 wherein at least one of said tonal variations is a tone which is four whole notes higher than said in utero maternal baseline tone.

6. The method of claim 3 wherein said tones in subsequent sequences of tones have increased tonal variations from the in utero maternal baseline tone.

7. The method of claim 2 wherein said step of determining an in utero maternal baseline tone comprises the steps of: inserting a microphone through a cervix of said woman; and recording sounds from said microphone inserted in said woman.

8. The method of claim 7 wherein said pattern of sonic variations is determined by adjusting a tone of a digital sampling of said recorded sounds; and comparing said pattern of sonic variations received at the womb wall after transmission to said fetus with said transmitted pattern of sonic variations.

9. The method of claim 1 further comprising the step of: storing said pattern of sonic variations in an electronic integrated circuit.

10. The method of claim 9 wherein said transmitting step comprises transmitting said stored plurality of patterns from said electronic integrated circuit to said fetus with a sonic transducer.

11. The method of claim 1 wherein said transmitting step comprises positioning a transmission means proximate to said woman's abdomen and transmitting said sequence of tones by said transmission means through an abdominal wall of said woman to said fetus.

12. A method for adjusting cognitive function of a post-natal human comprising the steps of:

determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones each sequence being repeated at a predetermined tempo; and

transmitting each of said sequences of tones in soundwave form to said human during a predetermined period, wherein a tempo at which each subsequent said sequence of tones is repeated is selected to be increased or decreased during the predetermined period and said transmitting step comprises positioning a transmission means proximate to a forehead of said human and transmitting said sequence of tones through the cranial surface to said human.

13. A method for improving the cognitive function of a premature baby comprising the steps of:

determining a pattern of sonic variations, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo; and transmitting each of said sequences of tones in soundwave

form to said premature baby during a predetermined period, wherein a tempo at which each subsequent said sequence of tones is repeated is selected to be increased during the predetermined period and wherein said transmitting step comprises positioning means for a transmission means proximate to said premature baby on a hospital incubator and transmitting said sequence of tones through or from a wall of said hospital incubator.

14. A system for increasing cognitive function of a fetus in utero in a woman comprising:

means for determining a pattern of sonic variations, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo;

means for selecting each of said sequences of tones to be transmitted at a predetermined time during the term of pregnancy; and

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means for transmitting each of said sequences of tones in soundwave form to said fetus during different periods within the term of the pregnancy.

15. The system of claim 14 wherein a tempo at which each subsequent said sequence of tones is repeated is selected to be increased during the term of the pregnancy.

16. The system of claim 14 further comprising:

means for determining an in utero maternal baseline tone.

17. The system of claim 16 wherein each of said tones in said sequence of tones is said in utero maternal baseline tone.

18. The system of claim 16 wherein each of said tones in said sequence of tones is said in utero maternal baseline tone or a tonal variation from said in utero maternal baseline tone.

19. The system of claim 14 further comprising:

means for recording sounds from a womb of said woman; and

means for determining a maternal baseline from said recorded sounds.

20. The system of claim 19 wherein said pattern of sonic variations is determined by adjusting a tone of a digital sampling of said recorded sounds.

21. The system of claim 20 further comprising:

means for comparing said pattern of sonic variations received at the womb wall after transmission to said fetus with said transmitted pattern of sonic variations.

22. The system of claim 14 further comprising:

means for storing said pattern of sonic variations in an electronic integrated circuit.

23. The system of claim 14 further comprising:

means for positioning said transmission means proximate to said woman's abdomen and transmitting said sequence of tones through an abdominal wall of said woman to said fetus.

24. A system for increasing cognitive function of a premature baby comprising:

means for determining a pattern of sonic variations, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo;

means for selecting each of said sequence of tones to be transmitted at a predetermined time;

means for transmitting each of said sequences of tones in soundwave form to said fetus during different periods within the term of the pregnancy;

and means for transmission means proximate to said premature baby on a hospital incubator and transmitting said sequence of tones through or from said hospital incubator.

25. A method for improving cognitive function of a fetus in utero in a woman, comprising the steps of:

determining a pattern of sonic variations, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo;

determining an in utero maternal baseline tone, each of said sequence of tones is said in utero maternal baseline tone or a tonal variation from said in utero maternal baseline tone; and

transmitting each of said sequences of tones in soundwave form to said fetus during different periods within the term of the pregnancy,

wherein said tonal variations of each subsequent said sequence of tones is selected to be increased during the term of the pregnancy.

\* \* \* \* \*

## EXHIBIT B



US007025594B2

**(12) United States Patent**  
**Logan**

**(10) Patent No.:** US 7,025,594 B2  
**(45) Date of Patent:** \*Apr. 11, 2006

**(54) METHOD AND SYSTEM FOR REPRODUCING A PROGRESSIVE OR REGRESSIVE PATTERN OF SONIC VARIATIONS**

**(76) Inventor:** Brent E. Logan, P.O. Box 33948, Seattle, WA (US) 98133

**(\*) Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 319 days.

This patent is subject to a terminal disclaimer.

**(21) Appl. No.:** 10/071,037

**(22) Filed:** Feb. 8, 2002

**(65) Prior Publication Data**

US 2002/0076680 A1 Jun. 20, 2002

**Related U.S. Application Data**

**(62) Division of application No. 09/421,659, filed on Oct. 20, 1999, now Pat. No. 6,494,719.**

**(51) Int. Cl.**

*G09B 23/28* (2006.01)

**(52) U.S. Cl.** 434/262; 434/236; 600/26; 600/27; 600/28

**(58) Field of Classification Search** 434/262; 434/236, 319, 273; 224/664; 600/26-28; 600/545; 381/151

See application file for complete search history.

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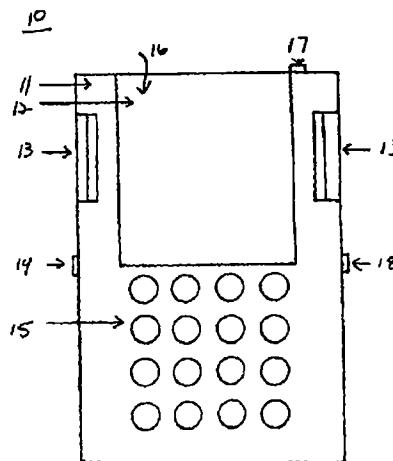
*(74) Attorney, Agent, or Firm*—Mathews, Shepherd, McKay & Bruneau, P.A.

**(57)**

**ABSTRACT**

The present invention relates to a system and method for increasing the cognitive function in a fetus. The system transmits a pattern of sonic variations to the fetus. The pattern of sonic variations is formed of a plurality of sequences of tones in which each sequence is repeated at a predetermined tempo. Each sequence of tones is selected to be transmitted to the fetus at a predetermined time during the term of the pregnancy. Preferably, each subsequent sequence of tones is selected to be repeated at increasing tempo during the term of the pregnancy, thereby providing a progressive pattern of sonic variations. A similar system and method can be used for improving the cognitive function of a premature baby. In addition, the present invention relates to a system and method for altering the cognitive function in a postnatal human by transmitting aurally or through bone conduction a progressive pattern of sonic variations or a regressive pattern of sonic variations to the wearer of the system.

**14 Claims, 9 Drawing Sheets**



**COMPLAINT**

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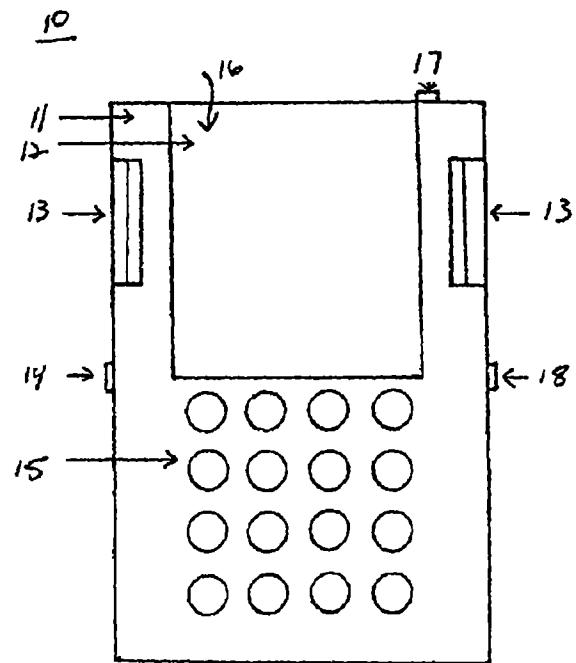


FIG. 1

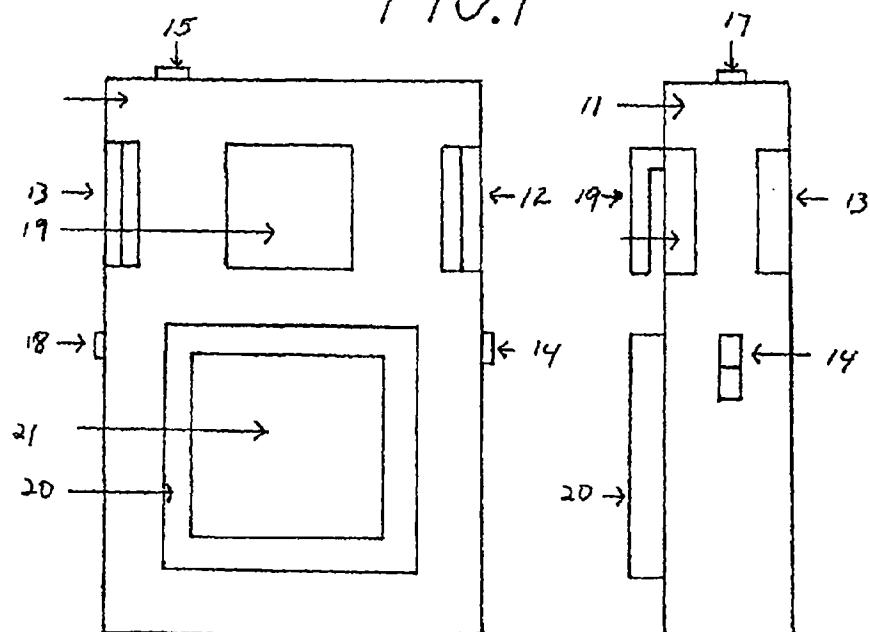


FIG. 2

FIG. 3

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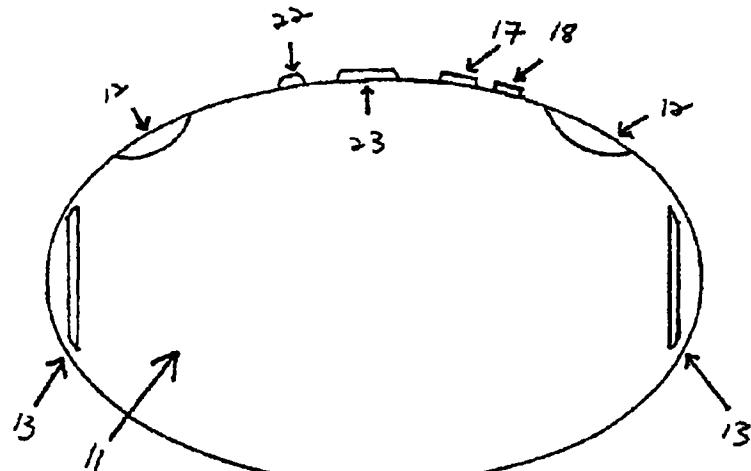


FIG. 4

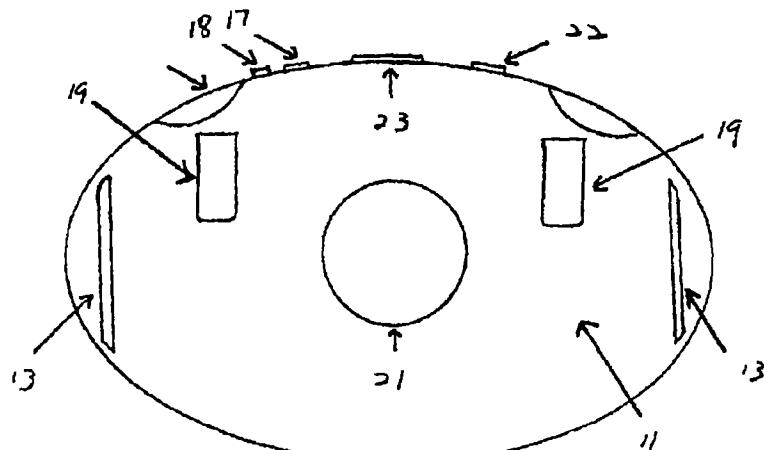


FIG. 5

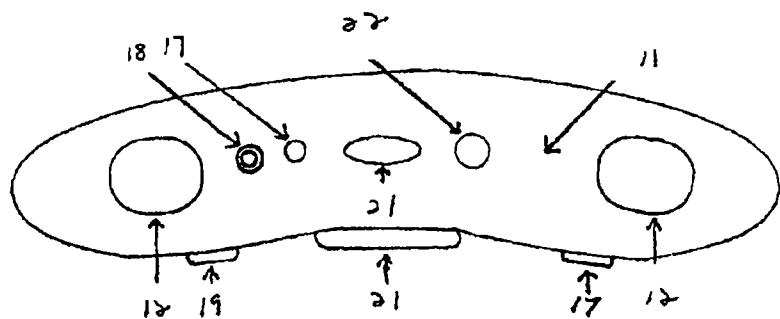


FIG. 6

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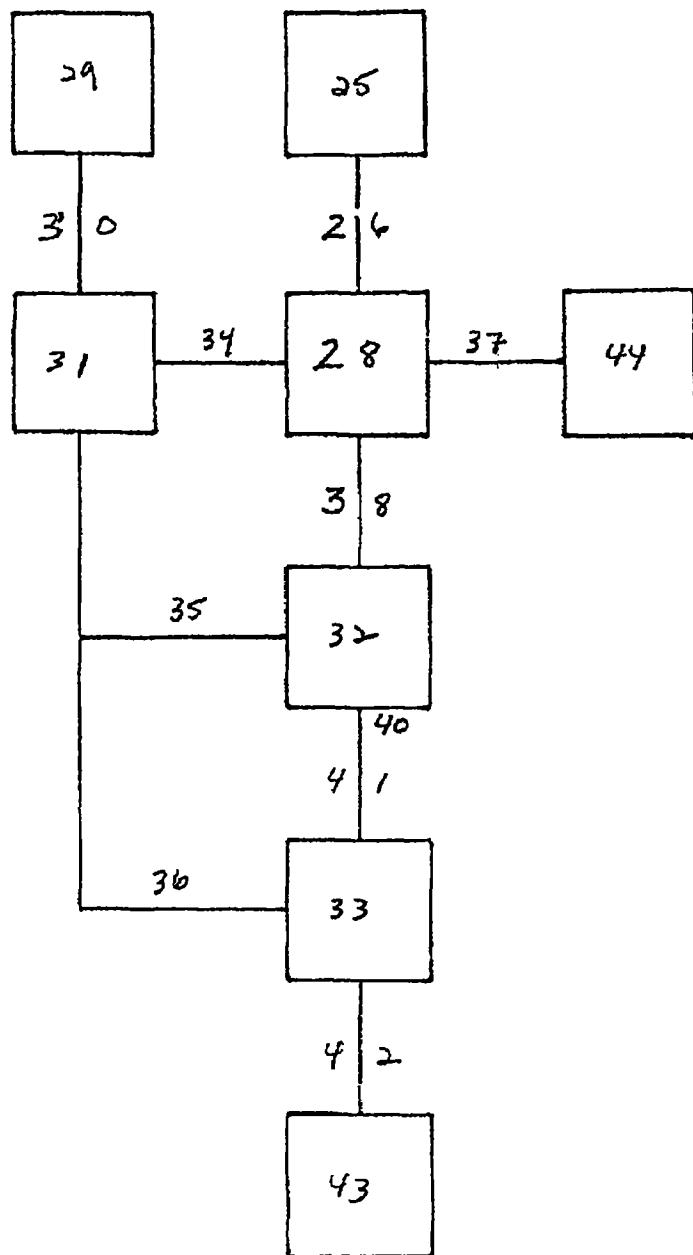


FIG. 7

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FIG. 8A

	NOTES												HERTZ
50a	A	A	A	C	A	A	A	C	A	A	A	A	1.00
50b	A	A	C	A	A	C	A	A	C	A	A	A	1.25
50c	A	C	A	C	A	C	A	C	A	C	A	A	1.50
50d	A	A	C	C	A	A	C	C	A	A	C	A	1.75
50e	A	C	C	A	C	C	A	C	C	A	C	A	2.00
50f	A	C	C	C	A	C	C	C	A	C	C	C	2.25
50g	A	A	C	C	C	A	A	C	C	C	A	A	2.50
50h	A	A	A	C	C	C	A	A	A	C	C	C	2.75
50i	A	A	A	C	C	C	E	A	A	A	C	A	3.00
50j	A	A	A	C	C	C	E	E	A	A	A	A	3.50
50k	A	A	A	C	C	C	E	E	E	A	A	A	4.00
50l	A	A	A	C	C	C	E	E	E	E	C	C	4.50
50m	A	A	C	C	E	E	C	C	A	A	C	A	5.00
50n	A	A	C	C	E	E	A	A	C	C	E	E	5.50
50o	A	C	E	A	C	E	A	C	E	A	C	C	6.00
50p	A	C	E	C	A	C	E	C	A	C	E	E	6.50

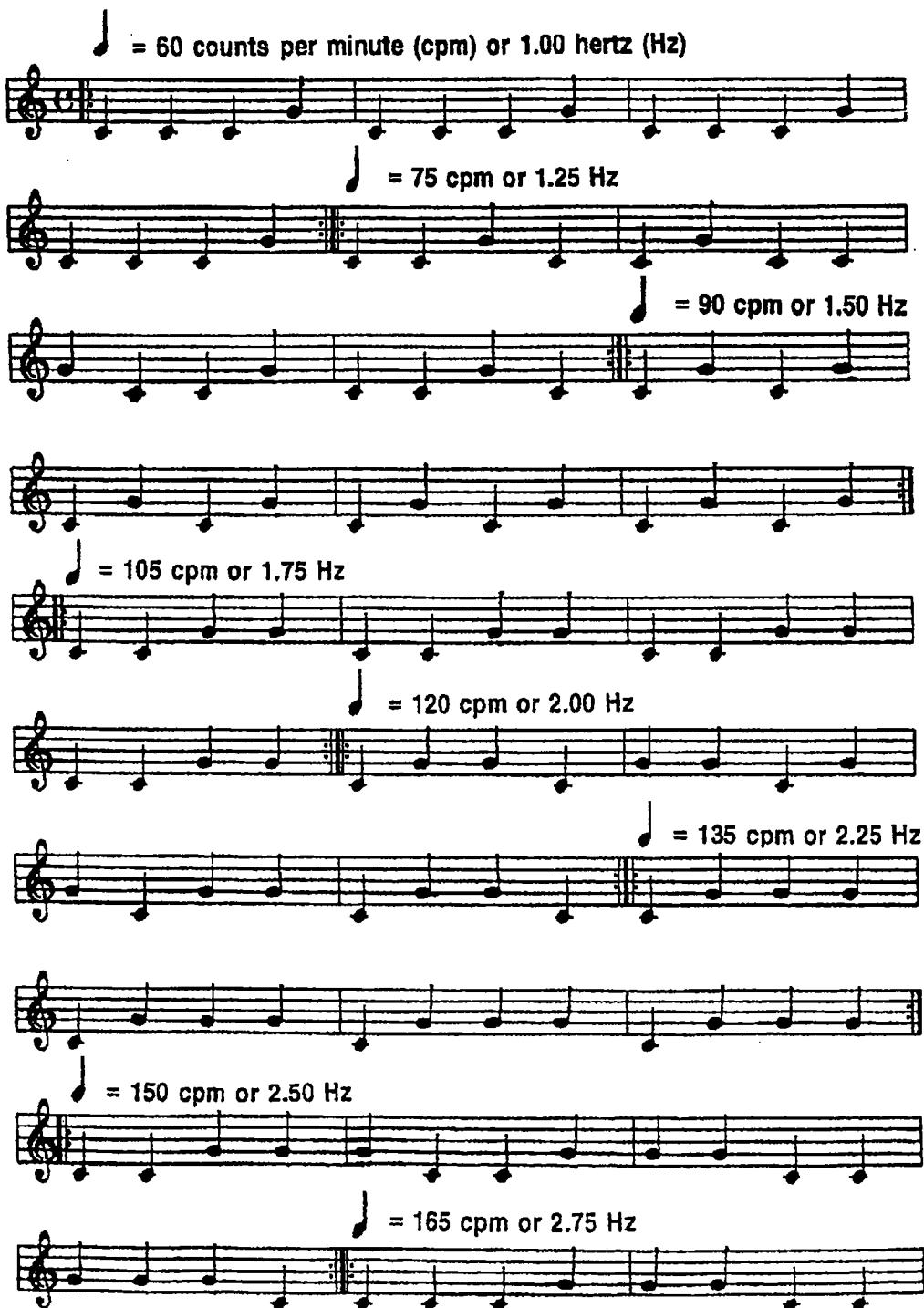
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FIG 8B



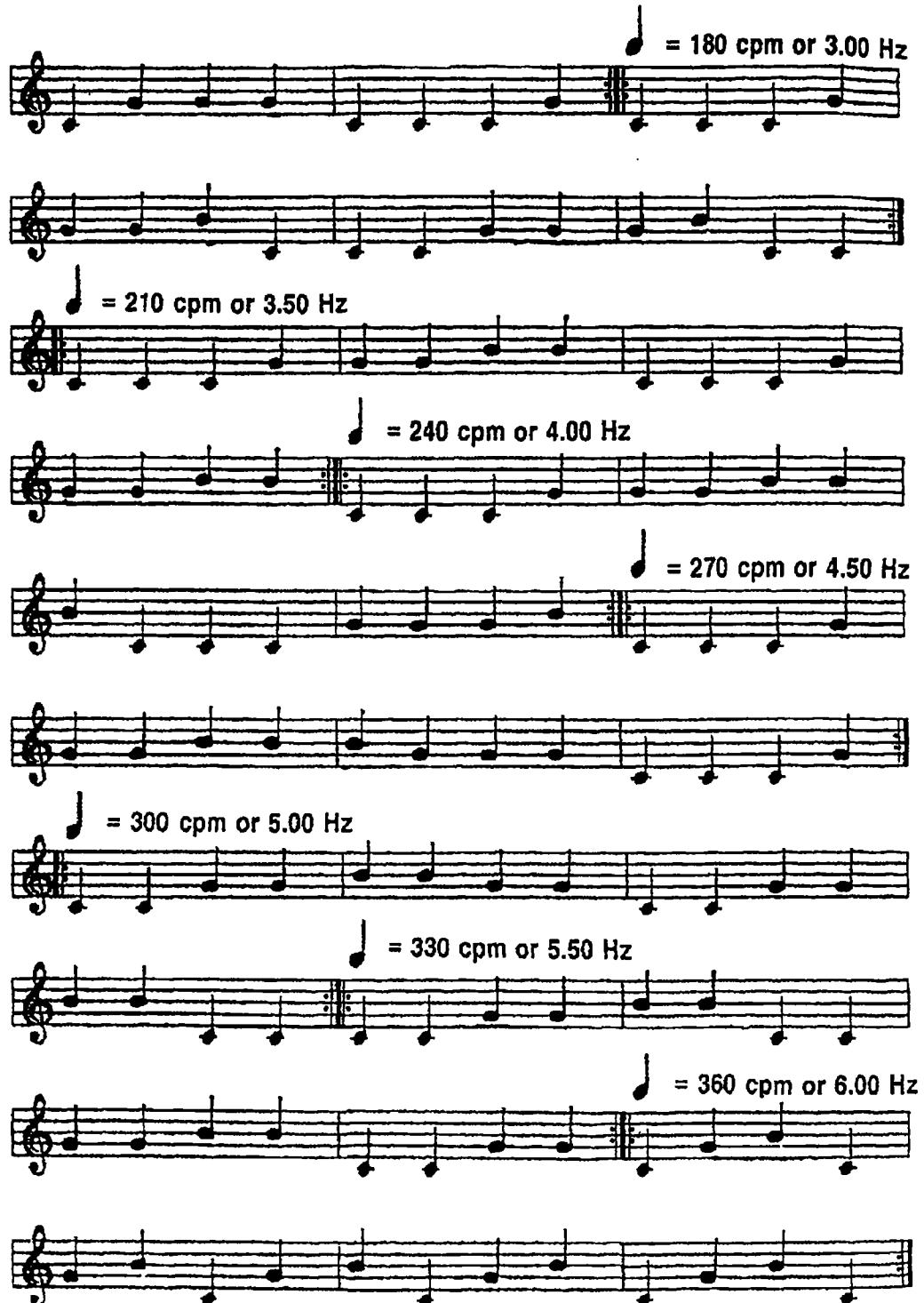
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FIG 8B (cont)

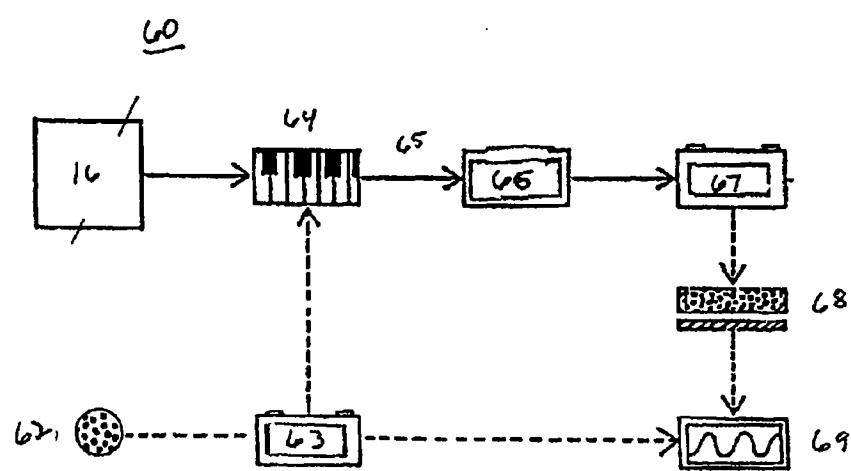


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*FIG. 9*

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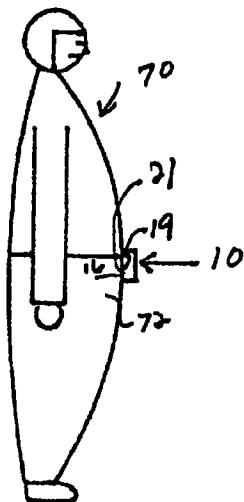


FIG. 10

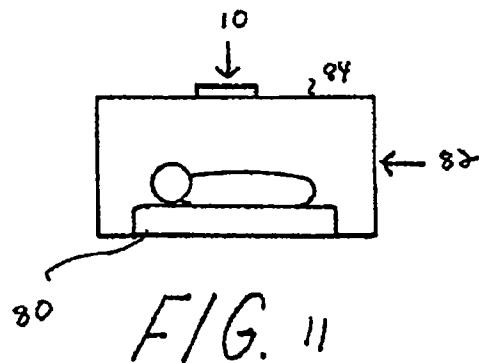


FIG. 11

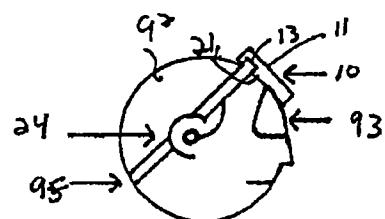


FIG. 12

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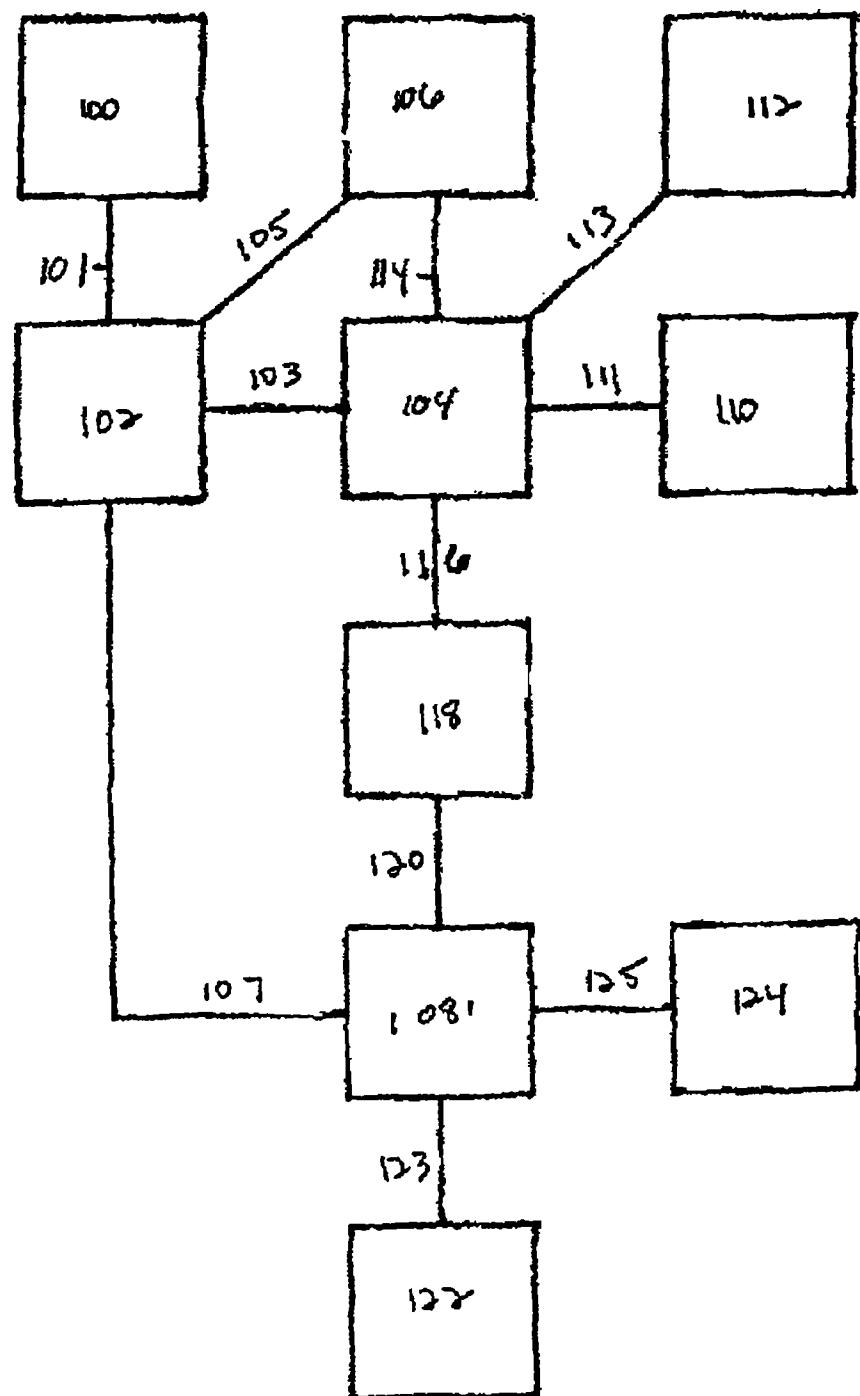


FIG. 13

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**METHOD AND SYSTEM FOR  
REPRODUCING A PROGRESSIVE OR  
REGRESSIVE PATTERN OF SONIC  
VARIATIONS**

This application is a divisional of U.S. patent application Ser. No. 09/421,659 filed Oct. 20, 1999 now U.S. Pat. No. 6,494,719.

**BACKGROUND OF THE INVENTION**

**1. Technical Field**

The present invention relates to a method and system of reproducing a pattern of sound variations and applying the pattern to a human fetus, infant, child, adolescent or adult, with possible animal applications.

**2. Description of the Related Art**

Systems are known for transmitting external stimuli to the human fetus. U.S. Pat. No. 4,798,539 describes a method and system for systematically educating and communicating with a baby in its mother's womb. Educational messages or soothing messages are transmitted to the fetus. The messages can include, for example, soothing music, simple words or nursery rhymes.

U.S. Pat. No. 5,033,968 describes a method and apparatus for presenting voice or noise to a fetus in which the sounds more accurately resemble the same sounds as the baby will hear after birth. Recorded sounds are contoured and amplified. The sound range is in the 1000 to 2000 hertz range on the order of 90 to 95 decibels.

U.S. Pat. No. 5,491,756 discloses a system for delivering sound to a fetus through the mother's abdomen and which also allows monitoring of the effects of the sound on the fetal child. A sound generator, for example a radio or so called "walkman" unit, generates sound. The sound is applied by speakers located on a belt. The belt is juxtaposed to the abdomen in proximity of the fetal child. The sound can include soothing music or like sounds. A stethoscope is located in proximity to the fetal child to monitor the effects on the fetal child.

Mental performance in vertebrates is signified by electrical energy which can be monitored on the cranial surface with skin transducers producing an electro-encephalogram (EEG). Such output is measured in cycles per second (hertz). An alpha rhythm relates to a human baseline indicating a state of relaxed wakefulness when the eyes are closed. Some analyses have shown alpha rates generally rise according to increased neural complexity on the evolutionary scale, from amphibia to *Homo sapiens*. Human alpha rhythm is attained by puberty in the range of 8-13 hertz, averaging 10 hertz, and diminishes only slightly with age.

Both prebirth and newborn alpha rhythms, referred to as protoalpha, have been found to be in the range of 1-2 hertz and the alpha rhythms increase incrementally until reaching the adult maximum of 10 hertz. Developmentally, it has been suggested that an alpha rhythm can be both a significant empirical indicator and predictor of reduced or amplified mental capacity. A child whose alpha rhythm is advanced beyond the norm may therefore have attained a more mature level of cognitive function than someone of similar age having a lower alpha rhythm.

It is desirable to provide a method and system for reproducing sonic variations in which the tempo and/or pitch of the variations can be altered to provide a predetermined pattern which can be applied to a wearer of the system in order to affect a desired increased cognitive function.

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**SUMMARY OF THE INVENTION**

The present invention relates to a system and method for increasing the cognitive function in a fetus. It has been found that a progressive pattern of sonic variations reproducing incrementally faster alpha rhythms at levels and formats appropriate to the prenatal stage which is repeatedly transmitted to the fetal child is advantageous in increasing cognitive function. The pattern of sonic variations is formed of a plurality of sequences of tones in which each sequence is repeated at a predetermined frequency. Each sequence of tones is selected to be transmitted to the fetus at a predetermined time during the term of the pregnancy. Preferably, each subsequent sequence of tones is selected to be repeated at increasing frequency during the term of the pregnancy, thereby providing a progressive pattern of sonic variations.

The method can include a determination of a maternal bloodpulse baseline as it occurs in utero. Tones in the pattern of sonic variations can be determined as the tone of the maternal bloodpulse baseline or tonal variations therefrom. The tonal variations can be selected to increase in subsequent sequences of tones.

A similar system and method can be used for improving the cognitive function of a premature baby. In addition, the present invention relates to a system and method for altering the cognitive function in a postnatal human being by transmitting aurally or through bone conduction a progressive pattern of sonic variations or a regressive pattern of sonic variations to the wearer of the system.

The invention will be more fully described by reference to the following drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a schematic diagram of a front view of a system for reproducing sonic variations.

FIG. 2 is a schematic diagram of a rear view of the system.

FIG. 3 is a schematic diagram of a side view of the system.

FIG. 4 is a schematic diagram of a front view of an alternate embodiment of the system.

FIG. 5 is a schematic diagram of a rear view of the system shown in FIG. 4.

FIG. 6 is a schematic diagram of a front view of an alternate embodiment of the system.

FIG. 7 is a schematic diagram of electronic circuitry for the system.

FIG. 8A is a schematic diagram of a progressive sound pattern of sonic variations for use with the system.

FIG. 8B is musical notation of the progressive sonic pattern of sonic variations shown in FIG. 8A.

FIG. 9 is a schematic diagram of a method for obtaining an in utero sonic baseline and generating the pattern of sonic variations.

FIG. 10 is a schematic diagram of the system in a prenatal application.

FIG. 11 is a schematic diagram of the system in a premature baby application.

FIG. 12 is a schematic diagram of the system in a postnatal application.

FIG. 13 is a schematic diagram of alternative electronic circuitry for the system.

**DETAILED DESCRIPTION**

Reference will now be made in greater detail to a preferred embodiment of the invention, an example of which is

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illustrated in the accompanying drawings. Wherever possible, the same reference numerals will be used throughout the drawings and the description to refer to the same or like parts.

FIGS. 1-3 illustrate a system for reproducing sonic variations 10 in accordance with the teachings of the present invention. Housing 11 includes power supply cover 12 for covering a power supply such as batteries (not shown). Housing 11 has a substantially rectangular or square shape. Openings 13 are formed in housing 11 for receiving a belt or band formed for example of elastic or fabric. On/Off switch 14 controls operation of power to system 10.

Program buttons 15 control selection of a plurality of patterns of sonic variations 16, as described in more detail below. For example, each of the sixteen program buttons 15 can be associated to access one of sixteen sequences of tones stored in system 10 which sequences form the pattern of sonic variations 16. For example, the pattern of sonic variations 16 can be stored on a microchip. Alternatively, a cassette or compact disc player can be used with system 10 to access patterns of sonic variations stored respectively on a cassette tape or compact disc or other removable storage media. Low power indicator light 17 indicates low power of the power supply. Jack opening 18 extends into housing 11 for receiving supplemental speakers or earphones (not shown). Earphones can be used to listen to the patterns of sonic vibrations being transmitted by system 10.

Apparel clip 19 extends from housing 11. Apparel clip 19 can be clipped to a waistband of a wearer of system 10. Sound proofing material 20 surrounds speaker face 21 for directionally focusing sound from system 10.

FIGS. 4 and 5 illustrate an alternative embodiment in which housing 11 has an elliptical or circular shape. Button 22 is used to access the pattern of sonic vibrations 16 stored in system 10. For example, button 22 can sequentially access each sequence of tones forming the pattern of sonic variations 16 in order to aid a wearer in sequentially selecting the sequence of tones to be transmitted to the fetal child. Liquid crystal display 23 is attached to housing 11. Liquid crystal display 23 provides viewing of the accessed sonic pattern of variations 16. FIG. 6 illustrates a top view of housing 11, which has a contoured shape for applying speaker face 21 to a curved shape such as an abdomen of a pregnant woman.

FIG. 7 illustrates a schematic circuit diagram of electronic circuitry for system 10. Selection switch 25 provides on/off contact and program selection through connection 26 to power and countercircuit input tabs of microchip 28. For example, microchip 28 can be an eighteen-pin digitally stored microchip. Power initiates as low voltage alternating current 29 and is converted through converter 30 to direct current for charging battery 31. Battery 31 provides power to microchip 28, voice synthesizer 32 and transducer driver 33 through connection 34, connection 35 and connection 36, respectively. The direct current is controlled by selection switch 25 through connection 34 and connection 37. When selection switch 25 is pressed, the signal passes through connection 37 to microchip 28. Microchip 28 generates pulse signals through connection 38 to voice synthesizer 32. Voice synthesizer 32 generates sonic signal 40 through connection 41 to transducer driver 33. Transducer 43 is driven by transducer driver 33 through connection 42. Timer circuit 44 produces a pulse through connection 45 when the timer counter overflows.

A pattern of sonic variations 16 is formed of a plurality of sequences of tones. For example, the pattern of sonic variations 16 can be formed of sixteen sequences of tones. Each sequence of tones is repeated at a predetermined

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tempo. Each sequence of tones can be a repetition of the same tone or a repetition of a pattern of tonal variations having different pitches. Each of the repeated sequences of tones is transmitted by system 10 for a predetermined period of time to a wearer of system 10. The period of time each repeated sequence is transmitted can be determined for various applications of system 10. For example, the period of time can be the term of pregnancy for a prenatal application or a period of weeks or months for a postnatal application.

A progressive pattern of sonic variations is defined as a pattern in which the tempo is increased at which each sequence in the pattern is repeated. A regressive pattern of sonic variations is a pattern in which the tempo is decreased at which each sequence in the pattern is repeated.

Operation of system 10 in a method for improving cognitive function of a fetus in utero is shown by the following example. The system is used for the auditory driving of alpha rhythm, and imprinting of the fetal child. FIG. 8A illustrates an example of a progressive pattern of sonic variations 16 for increasing the cognitive function of a human fetus in utero. In this example, a progressive pattern of sonic variations is formed of 16 sequences of tones represented in rows 50a-50p. The tone represented by "A" is a tone of an in utero baseline maternal bloodpulse, which will be described in more detail below. The tone represented by "C" is a tone which is two whole notes higher than the tone represented by "A". The tone represented by "E" is a tone which is two whole notes higher than the tone represented by "C". The sequence of tones are repeated and the repeated sequence of tones are transmitted for a particular duration, for example one hour. The tempo at which each of the sequences of tones in rows 50a-50p is transmitted to the fetus in utero is represented in column 52. Alternatively, increasing tonal variations can be used in each subsequent sequence with each sequence having the same tempo.

In this example, the frequency at which each sequence is transmitted is increased in first 0.25 hertz and then 0.50 hertz increments from the resting human heart rate of 1 hertz. In the progressive pattern of sonic variations in this example, each successive sequence of tones has a pattern of increased tonal variations from the maternal baseline tone so that the last pattern has the fewest tones of the maternal baseline represented by "A" and the most tonal variations represented by "C" and "E". In the method, each of the sequences of tones represented in rows 50a-50p is transmitted to the fetus during different periods within the term of pregnancy. For example, each sequence of tones can be played during a particular week of pregnancy. Accordingly, the first sequence represented by row 50a can be played for a length of time, i.e. one hour, a few times a day to the fetus in utero starting midterm of the pregnancy, i.e. the 24<sup>th</sup> week of pregnancy. It has been found that stimulation after the first trimester of pregnancy is advantageous since there is better developed fetal hearing. A second sequence represented by row 50b can be played the subsequent week of pregnancy, i.e. 25<sup>th</sup> week of pregnancy, and each subsequent sequence represented by rows 50c-50p is played during subsequent weeks of pregnancy until birth of the fetus at approximately 39.5 weeks. It has been found that application of the above-described method results in a higher alpha rhythm for the infant stimulated with system 10 than the alpha rhythm measured in infants not stimulated with system 10. It will be appreciated that the period of time for transmitting each sequence can be varied according to the time at which the method begins, i.e., if the method is initiated at the 30<sup>th</sup> week each of the sequences of tones represented by rows 50a-50p

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could be transmitted to the fetal child for approximately four days. Also, other progressive patterns of sonic variations having different increasing frequencies or tonal variations could be used to increase cognitive function in accordance with the teachings of the present invention.

FIG. 8B presents in standard musical notation the progressive pattern of sonic patterns shown in FIG. 8A of tones increasing in tempo from an alpha rhythm baseline and adding pitch variations of two and four whole notes from the baseline tone.

In alternate postnatal embodiments for offsetting under or overactive physical or psychological status, a progressive pattern of sonic variations in alpha rhythm or a regressive pattern of sonic variations in alpha rhythm can be transmitted to the individual over a treatment time period for accelerating or decelerating cortical alpha rhythms in the treated individual. The pattern of sonic variations permit users to achieve stimulatory or relaxant behavioral states by receiving transmissions as progressively or regressively sequenced audiovibratory frequencies, thereby adjusting alpha brainwave activity. In the concurrent absence of visual stimuli, the pattern of sonic variations increase or decrease the rates of cortical data processing by providing throughout the mental structure governing influences which promote like sinusoidal patterns. From auditory driving, these physiosonic impulses gradually move the existing cognitive mode toward its desired alternative over a selected period of time. Duration of the effect is dependent upon length of application, user psychodynamics, and subsequent environmental factors. The advantages of operation of system 10 for applying a selected progressive pattern of sonic variations to infants, children, adolescents, and adults are improving cognitive performance, overcoming tiredness, and mitigating depression. The advantages of operation of system 10 for applying a selected regressive pattern of sonic variations to infants, children, adolescents, and adults are reducing stress and hypertension, countering sleep disorders and calming hyperactivity. System 10 could also be altered for sonic and/or physical requirements of designated species for application to animals.

FIG. 9 illustrates a method for obtaining an in utero sonic baseline 60 and generating the baseline outside the defined pattern of sonic variations 16. Microphone 62 is inserted through the cervix to obtain a real-time in utero bloodpulse recording 63 of the womb's sounds. Microphone 62 can be a hydrophone or liquid-impervious microphone. Digital sampling system 64 permits progressive temporal sequences 65 to be derived from in utero bloodpulse recording 63. Adjustments in tone, pitch, and volume of digitally sampled progressions is performed in block 66 in order to compensate for abdominal tissue, fluid and bone attenuation and provide the progressive pattern of sonic variations 16. Preferably, the sound volume of the transmitted pattern of sonic variations 16 can be adjusted below that normally experienced in the womb yet sufficient for fetal discernment. The progressive pattern of sonic variations 16 is transmitted to a recipient fetus in utero with uterine transmission source 67. The progressive pattern of sonic variations 16 applied by uterine transmission source 67 is also filtered back through womb wall 68, real or simulated. Real-time analyzer 69 compares the received filtered baseline from womb wall 68 with that of uterine transmission source 67 for assuring fidelity of the progressive pattern of sonic variations to the in utero bloodpulse.

FIG. 10 shows prenatal use of system 10 positioned in proximity to an abdomen of woman 70 by means of apparel clip 19 attached to apparel 72 worn by woman 70. Speaker

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face 21 faces the fetus in utero for transmission of the pattern of sonic variations 16 to the cerebral cortex of the fetus.

FIG. 11 shows use of a system with a premature baby 80 by affixing system 10 to hospital incubator 82, thereby locating system 10 proximately to premature baby 80. The pattern of sonic variations 16 is transmitted through or from wall 84 to the cerebral cortex of premature baby 80.

FIG. 12 shows a postnatal application of system 10 in which speaker face 21 is positioned on cranial surface of human 92 for applying the pattern of sonic variations 16 to the cerebral cortex. Eye mask 93 can be placed over the wearers eyes to block visual stimuli. Earphone 94 also provides aural transmission of the pattern of sonic variations 16 to human 92. Elastic or fabric belt or band 92 extends through openings 13 of housing 11 for positioning system approximate to the cerebral cortex.

FIG. 13 illustrates an alternative circuit diagram of electronic circuitry for system 10. Battery 100 provides voltage to regulator 102 through connection 101. Regulator 102 provides power to microprocessor 104, memory device 106 and transducer driver 108 through connection 103, connection 105 and connection 107 respectively. Selection switch 110 provides program selection and power-up interrupt on input tab of microprocessor 104 through connection 111. For example, microprocessor 104 can be a forty-four-pin digitally stored microprocessor such as manufactured by Microchip as PIC16C64.

When interrupted by selection switch 110, microprocessor 104 displays the current file number on display 112 through connection 113. Further interrupts by selection switch 110 to microprocessor 104 select the next file number in sequence. When a file is selected, microprocessor 104 queries memory device 106 through connection 114 for the sound waveform information. Microprocessor 104 generates width modulated pulse signals through connection 116 to filter network 118. Filter network 118 converts the width modulated pulse signals into a voltage waveform. The voltage waveform is passed from the filter network 118 to the transducer driver 108 through connection 120. Transducer 122 and transducer 124 are driven by transducer driver 108 through connection 123 and connection 125 respectively.

It is to be understood that the above-described embodiments are illustrative of only a few of the many possible specific embodiments which can represent applications of the principles of the invention. Numerous and varied other arrangements can be readily devised in accordance with these principles by those skilled in the art without departing from the spirit and scope of the invention.

1 claim:

1. A method of treating a postnatal human for accelerating or decelerating cortical alpha rhythms of the postnatal human comprising the steps of:

determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones each sequence being repeated at a predetermined tempo; and

transmitting each of said sequences of tones in a sound-wave form to said human during a predetermined period,

wherein a tempo at which each subsequent said sequence of tones is repeated is selected to be increased or decreased during the predetermined period thereby accelerating or decelerating cortical alpha rhythms of the postnatal human and said tones in said pattern of sonic variations are an alpha rhythm baseline tone or a tonal variation from said alpha rhythm baseline tone.

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2. The method of claim 1 further comprising the step of: storing said pattern of sonic variations in an electronic integrated circuit.

3. The method of claim 2 wherein said transmitting step comprises transmitting said stored plurality of patterns from said electronic integrated circuit to said human with a sonic transducer.

4. A method of treating a premature baby for accelerating or decelerating cortical alpha rhythms of the premature baby comprising the steps of:

determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo; and

transmitting each of said sequences of tones in soundwave form to said premature baby during a predetermined period, wherein a tempo at which each subsequent said sequence of tones is repeated is selected to be increased during the predetermined period thereby accelerating or decelerating cortical alpha rhythms of the premature baby and said tones in said pattern of sonic variations are an alpha rhythm baseline tone or a tonal variation from said alpha rhythm baseline tone.

5. The method of claim 4 further comprising the step of: storing said pattern of sonic variations in an electronic integrated circuit.

6. The method of claim 5 wherein said transmitting step comprises:

transmitting said stored plurality of patterns from said electronic integrated circuit to said premature baby with a sonic transducer.

7. A system for treating a postnatal human accelerating or decelerating cortical alpha rhythms of the postnatal human comprising:

means for determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo;

means for selecting each of said sequences of tones to be transmitted at a predetermined time during a predetermined period; and

means for transmitting each of said sequences of tones in soundwave form to said human during said predetermined period, wherein said tones in said pattern of sonic variations are an alpha rhythm baseline tone or a tonal variation from said alpha rhythm baseline tone in which subsequent sequences increase or decrease in tempo.

8. The system of claim 7 further comprising:

means for storing said pattern of sonic variations in an electronic integrated circuit.

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9. The system of claim 8 wherein means for transmitting comprises said stored plurality of patterns from said electronic integrated circuit to said human with a sonic transducer.

10. A system for treating a postnatal human accelerating or decelerating cortical alpha rhythms of the postnatal human comprising:

means for determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo, said tones in said pattern of sonic variations are an alpha rhythm baseline tone or a tonal variation from said alpha rhythm baseline tone;

means for selecting each of said sequences of tones to be transmitted at a predetermined time during a predetermined period;

means for transmitting each of said sequences of tones in soundwave form to said human during said predetermined period; and

means for positioning a transmission means proximate to a forehead of said human and transmitting said sequence of tones aurally thereby accelerating or decelerating cortical alpha rhythms of the postnatal human.

11. A system for treating a premature baby accelerating or decelerating cortical alpha rhythms of the premature baby comprising:

means for determining a pattern of sonic variations in alpha rhythm, said pattern comprising a plurality of sequences of tones, each sequence being repeated at a predetermined tempo, said tones in said pattern of sonic variations are an alpha rhythm baseline tone or a tonal variation from said alpha rhythm baseline tone in which subsequent sequences increase in tempo;

means for selecting each of said sequences of tones to be transmitted at a predetermined time; and

means for transmitting each of said sequences of tones in soundwave form to said premature baby thereby accelerating or decelerating cortical alpha rhythms of the premature baby.

12. The system of claim 11 wherein said tones in said pattern of sonic variations are a baseline tone or a tonal variation from said baseline tone in which subsequent sequences increase in tempo.

13. The system of claim 11 further comprising:

means for storing said pattern of sonic variations in an electronic integrated circuit.

14. The system of claim 13 wherein said means for transmitting comprises transmitting said stored plurality of patterns from said electronic integrated circuit to said premature baby with a sonic transducer.

\* \* \* \* \*

# EXHIBIT C

Int. Cl.: 9

Prior U.S. Cls.: 21, 23, 26, 36, and 38

Reg. No. 2,449,736

**United States Patent and Trademark Office**

Registered May 8, 2001

**TRADEMARK  
PRINCIPAL REGISTER**

**BABYPLUS**

LOGAN, BRENT (UNITED STATES CITIZEN)  
1004 DALEY STREET  
EDMONDS, WA 98020

FOR: SOUND EQUIPMENT FOR EARLY LEARNING, NAMELY, CASSETTE PLAYERS AND PERSONAL SOUND GENERATORS IN THE FORM OF AUDIO TRANSMITTERS UTILIZING PATTERNED TONES OR MUSIC, AUDIOTCASSETTES FEATURING MUSIC, THE ALPHABET, AND RHYTHMS, ACOUSTIC SPEAKERS FOR USE THEREWITH,

AND CARRYING CASES FITTED EXCLUSIVELY FOR CASSETTE PLAYERS OR PERSONAL SOUND GENERATORS, IN CLASS 9 (U.S. CLS. 21, 23, 26, 36 AND 38).

FIRST USE 7-26-1995; IN COMMERCE 7-26-1995.

SN 75-596,978, FILED 11-30-1998.

KELLY BOULTON, EXAMINING ATTORNEY

# EXHIBIT D

**FIRST AMENDED LICENSE  
AND ASSIGNMENT AGREEMENT**

THIS FIRST AMENDED LICENSE AND ASSIGNMENT AGREEMENT (this "Agreement") is made and entered into as of the Effective Date, by and between Brent Logan (hereinafter "Logan"), a resident of the State of Washington with offices at 1004 Daley Street, Edmonds, WA 98020, and The BabyPlus Company (hereinafter "Company"), an Indiana Limited Liability Company with offices at 9750 Olympia Drive, Fishers, IN 46037.

**WITNESSETH:**

WHEREAS, Logan and Company have previously entered into a license agreement dated the 28th of July, 2000 (the Prior Agreement), and wish to amend the same by way of this Agreement;

WHEREAS, Logan owns a Trademark (as hereinafter defined) and has created a Work (as hereinafter defined) that consists of a prenatal and postnatal enrichment program and system for increasing cognitive function, including software, hardware and a manuscript of instructional and operating documentation relating to same on the subject of prenatal and postnatal learning; and

WHEREAS, Company desires to receive assignment of the Trademark and to license the Work on an exclusive basis to manufacture, market and distribute the Work; and

WHEREAS, Logan is willing to assign the Trademark and allow Company to so manufacture, market and distribute the Work on the terms and conditions of this Agreement.

NOW THEREFORE, the parties hereto, intending to be legally bound, hereby agree as follows:

**Section I  
DEFINITIONS**

For purposes of this Agreement, the following capitalized terms are defined as follows:

1.1 "Work" means a prenatal or postnatal enrichment program and system for increasing cognitive function, including software, hardware and related documentation created by Logan and any improvements or enhancements thereto as of the Effective Date.

1.2 "Patents" mean U.S. Patent No. 6,494,719 and U.S. Patent No. 7,025,594, and any continuation, continuation-in-part, reexamination, reissue and extension thereof, and any related foreign equivalents thereof.

1.3 "Royalty Term" means the longer of (1) the expiration date of the full statutory (20-year) term of the Patents, (2) the life of Logan, and (3) the life of Logan's wife as of the Effective Date of this Agreement.

1.4 "Trademark" means the registered mark BABYPLUS (U.S. Registration No. 2,449,736), any common law BABYPLUS mark, and any related trademark(s) of Logan.

1.5 "Net Sales" means Company's invoice price for the Product, less those taxes, duties and shipping charges separately stated on the invoice, and less returns and regular trade and quantity discounts.

1.6 "Effective Date" means the 1<sup>st</sup> of August, 2007.

1.7 "Product" means products the manufacture, use, sale, offer for sale or import of which, in the absence of this Agreement, would infringe at least one valid claim of the Patents, or products that are made using a process or machine the use of which, in the absence of this Agreement, would infringe at least one valid claim of the Patents.

## Section 2

### ASSIGNMENT OF TRADEMARK

2.1 Logan hereby assigns to Company all right, title and interest in and to the Trademark, together with the goodwill of the business symbolized by or associated with the Trademark, including the right to sue and collect damages for any past infringements. In order to properly record the foregoing assignment in the United States Patent and Trademark Office, upon the execution of this Agreement Company and Logan shall execute the Trademark Assignment document attached hereto as Exhibit A, and Company shall be responsible for

recording such Trademark Assignment document in the United States Patent and Trademark Office.

2.2 If Company terminates this Agreement under Section 8.2 prior to expiration of the Royalty Term, Company shall, simultaneously with such termination, assign all right, title and interest in and to the Trademark to Logan free and clear of any and all encumbrances.

2.3 During the Royalty Term, Company agrees to maintain current the registered mark BABYPLUS (U.S. Registration No. 2,449,736) and pay all costs associated with maintaining the same.

### Section 3

#### LICENSE GRANT TO COMPANY

3.1 Logan hereby grants to Company the exclusive worldwide right and license, under the Patents and any copyrights, trade secrets, know-how or other intellectual property rights of Logan associated with the Work, to make, have made, use, sell, offer to sell, import, copy, reproduce, modify, prepare derivative works, and distribute Product and the Work, including modified or derivative versions thereof, and to authorize or sublicense others to do some or all of the foregoing worldwide. Such right and license shall commence upon the Effective Date of this Agreement and shall continue for the Royalty Term, unless this Agreement is sooner terminated under Section 8.2 or Section 8.3. The exclusive right and license granted to Company hereunder also prohibits Logan from making, selling, or distributing Product or the Work during the term of this Agreement. Any right and license not specifically granted in this Agreement is expressly reserved by Logan. After the Royalty Term, the right and license granted in this Agreement shall convert to an exclusive, worldwide, perpetual and paid-up license.

3.2 Logan will not provide any confidential or proprietary information regarding the Work to any person or entity other than the Company without the consent of the Company.

3.3 Company agrees to diligently pursue and maintain current the Patents at Company's expense. Notwithstanding the foregoing, Company shall not be required to pursue or maintain current any non-U.S. patents or non-U.S. patent applications.

Section 4

**PAYMENT AND ROYALTIES**

4.1 Company shall pay Logan \$10,000 at execution of this Agreement, which amount is not to be credited against any other payment due Logan under this Agreement.

4.2 Company shall pay to Logan, or his estate in the event of his death, upon execution of this Agreement and each month thereafter during the Royalty Term, a Minimum Royalty in the amount of \$6,667 per month (\$80,000 per year) adjusted annually for cost of living in accordance with changes in the Consumer Price Index. Said Minimum Royalty shall be paid monthly in two equal payments, the first being due on the first (1<sup>st</sup>) and the second being due on the fifteenth (15<sup>th</sup>) of each month. Any cost of living adjustment to the Minimum Royalty shall initially be calculated on the 1<sup>st</sup> of January 2008, and then on a calendar year basis thereafter, with any increase in the Minimum Royalty being reflected evenly in the monthly payments due for the succeeding year.

4.3 Additionally, Company shall pay to Logan the following Sales Royalties at the end of each calendar year (as set forth in Section 4.4) during the term of this Agreement to the extent the Sales Royalties exceed the Minimum Royalty provided in Section 4.2: Three percent (3%) of Net Sales of Product worldwide. To the extent that the Royalty Term extends beyond the date of the last to expire of the Patents, the Sales Royalties shall continue to be calculated in the same manner, and shall be paid in consideration for assignment of the Trademark and for the ongoing license under other non-patent intellectual property rights associated with the Work.

4.4. For purpose of clarity, the Minimum Royalty of Section 4.2 is credited against the Sales Royalties of Section 4.3. Thus, Sales Royalties are due Logan only to the extent that, in any given calendar year, Sales Royalties exceeds the Minimum Royalty. Sales Royalties shall be payable (or notice of non-payment provided) within thirty (30) days after the end of the calendar year. Each payment to Logan of Sales Royalties (should the Sales Royalties exceed the

Minimum Royalty) or notice of non-payment of Sales Royalties (should the Sales Royalties not exceed the Minimum Royalty) shall be accompanied by a report that summarizes by type all transactions producing revenue and any corresponding deductions for the calculation of Net Sales for the prior calendar year (Summary Report). All calculations shall be made in accordance with generally accepted accounting principles.

4.4 For calculating payments due Logan for the year 2007, any amounts due under the Prior Agreement through the day preceding the Effective Date of this Agreement shall be owed and paid Logan according to the terms of the Prior Agreement. Following the Effective Date, no further payments shall be owed under the Prior Agreement, and the Prior Agreement shall be terminated. Any amounts due Logan from the Effective Date through the 31<sup>st</sup> of December 2007 shall be paid according to the terms of this Agreement, with any calculations based on a calendar year being reduced proportionally by the percentage of year remaining. To the extent any payments are due Logan during the last year of this Agreement, any calculations based on a calendar year shall be similarly reduced proportionally by the percentage of the year gone by.

4.5 Payments provided for in this Agreement, when overdue, will bear interest at a rate per annum equal to three percent (3%) in excess of the "Prime Rate" published by the "Wall Street Journal" at the time such payment is due, and for the period until payment is received.

## Section 5

### DISCLAIMER OF WARRANTIES

5.1 NOTHING IN THE AGREEMENT WILL BE DEEMED TO BE A REPRESENTATION OR WARRANTY BY LOGAN OF THE ACCURACY, SAFETY, OR USEFULNESS FOR ANY PURPOSE OF ANY TECHNICAL INFORMATION, TECHNIQUES, OR PRACTICES AT ANY TIME MADE AVAILABLE BY LOGAN. LOGAN WILL HAVE NO LIABILITY WHATSOEVER TO COMPANY OR ANY OTHER PERSON FOR OR ON ACCOUNT OF ANY INJURY, LOSS, DAMAGE, OF ANY KIND OR NATURE, SUSTAINED BY, OR ANY DAMAGE ASSESSED OR ASSERTED AGAINST, OR ANY OTHER LIABILITY INCURRED BY OR IMPOSED ON COMPANY OR ANY OTHER PERSON, ARISING OUT OF OR IN CONNECTION WITH OR RESULTING FROM

(A) THE PRODUCTION, USE, OR SALE OF ANY APPARATUS OR PRODUCT, OR THE PRACTICE OF THE PATENTS; (B) THE USE OF ANY INFORMATION, TECHNIQUES, OR PRACTICES DISCLOSED BY LOGAN; OR (C) ANY ADVERTISING OR OTHER PROMOTIONAL ACTIVITIES WITH RESPECT TO ANY OF THE FOREGOING, AND COMPANY WILL HOLD LOGAN HARMLESS IN THE EVENT COMPANY, OR ITS OFFICERS, EMPLOYEES, OR AGENTS, IS HELD LIABLE.

5.2 LOGAN WARRANTS THAT HE HAS NO KNOWLEDGE THAT THE MANUFACTURE, USE, OR SALE OF ANY PRODUCT OR WORK INFRINGES OR WOULD INFRINGE ANY INTELLECTUAL PROPERTY RIGHTS OF A THIRD PARTY, INCLUDING ANY PATENT RIGHTS OF ANY THIRD PARTY, AND LOGAN HAS RECEIVED NO NOTICE OR CLAIM FROM ANY THIRD PARTY ALLEGING SUCH INFRINGEMENT OR NOTIFYING LOGAN OF THE POSSIBILITY OF SUCH INFRINGEMENT; LOGAN FURTHER WARRANTS THAT HE HAS NO KNOWLEDGE THAT USE OF THE TRADEMARK IN COMMERCE INFRINGES OR WOULD INFRINGE ANY TRADEMARK RIGHT OF ANY THIRD PARTY, AND LOGAN HAS RECEIVED NO NOTICE OR CLAIM FROM ANY THIRD PARTY ALLEGING SUCH INFRINGEMENT OR NOTIFYING LOGAN OF THE POSSIBILITY OF SUCH INFRINGEMENT.

#### Section 6

#### COMPANY'S DUTIES

6.1 Company shall promote the sale of, solicit orders for, and distribute Products and shall offer Products either directly to consumers and/or to distributors on commercially reasonable terms calculated to maximize the profits attainable from distribution of the Product.

6.2 Company may alter, edit, prepare derivative works, supplement, and document the Work to enhance its marketability.

6.3 Company shall maintain accurate records of all manufacture, shipment, and distribution activities regarding the Work and revenue received with respect to such activities, and shall maintain such records during the term of this Agreement, and for one year after the termination hereof. All such records shall be made available to Logan for purposes of audit at

reasonable times no less frequently than once each year. Should such an audit find an underpayment to Logan of more than five percent (5%) from the year audited, Company will immediately pay Logan an amount equal to such underpayment and reimburse Logan the full cost of the audit.

6.6 Company shall at all times during the term of this Agreement maintain in effect product liability insurance in such amounts as are reasonable and customary for its business.

6.7 Company shall maintain the quality of all goods and services offered under the trademark "BabyPlus" and any Work licensed hereunder at least equal to that which has heretofore been offered under such marks.

6.8 Company shall use its best efforts to provide to Logan a monthly list by email (or hard copy should electronic access be unavailable) of all advertisements and media reports regarding the Work which appeared during the month prior, including (but not limited to) newspapers, magazines, radio, television, and electronic publications. Advertisements should include date of appearance, media name and location. Media information should include date of appearance, name of the author or program director, article title or program name, venue name and location. Company may at its discretion sent Logan copies of particular advertisements or media reports.

### Section 7

#### COMMITMENTS AND MARKETING EFFORTS

7.1 Notwithstanding any other provision of this Agreement, Company makes no guarantee of success regarding its efforts under this Agreement and makes no commitment whatever with respect to revenue to be achieved or royalties to be earned from the Work.

7.2 Logan agrees that performance of Company's duties hereunder in a manner that is reasonably calculated to bring the Work to the attention of distributors and/or consumers and to provide the same with a reasonable opportunity to procure and/or distribute/purchase the Work shall be sufficient to satisfy any marketing obligation of Company hereunder.

Section 8**TERM AND TERMINATION**

8.1 The term of this Agreement and the rights and licenses granted to the Company shall commence on the Effective Date hereof and shall continue, unless sooner terminated in accordance with the terms herein, until expiration of the Royalty Term.

8.2 Company may terminate this Agreement at any time and for any reason by written notice to Logan giving not less than ninety (90) days notice prior to such termination. Should any payments due Logan under this Agreement remain outstanding at the time of such termination, Company shall submit a Summary Report through the date of termination and pay Logan any remaining unpaid balance even if the due date for the same has not been reached.

8.3 Either party may terminate this Agreement for any material breach of this Agreement by the other party that continues, without waiver or cure, ninety (90) days after written notice to the other party. Such written notice shall describe such breach in reasonable detail. To this end, it is material breach of this Agreement for the Company to contest the validity or enforceability of one or more of the Patents in any court of competent jurisdiction, or to deny or delay payment due Logan based on such a position. The negotiated value of this Agreement is based on all the various intellectual property rights granted hereunder, including Trademark and Patents, as well as copyrights and other intellectual property rights in the Work. While Company is free to assert such a challenge to the Patents, Company recognizes and agrees that it shall lose the other privileges granted under this Agreement by doing so, and shall be required to assign the Trademark to Logan if Company contests the validity of such Patents.

Section 9**COPYRIGHT NOTICE**

9.1 Company may market and distribute the Work under Company's trademarks and trade names without restriction. Company may mark each Work "Copyright Brent Logan 1999," or a subsequent year as appropriate and Company may also mark with its own copyright those materials supplementing the Work that contain copyrightable subject matter of Company.

9.2 Company shall indemnify Logan and hold harmless Logan from and against any and all claims, actions, losses, costs, and liabilities based on any claims by third parties relating to sale and distribution of the Work.

9.3 The foregoing rights of indemnification shall be conditioned on the indemnified party (1) furnishing prompt notification to the indemnifying party; and (2) cooperating in the defense by the indemnifying party at the indemnifying party's expense.

Section 10

THIRD PARTY LITIGATION

10.1 Logan agrees to report all instances of suspected or known infringement to Company which Logan becomes aware of during the term of this Agreement.

10.2 When such action is deemed advisable by Company in the exercise of its sole discretion, Company shall have the first right (but not the obligation) to file and prosecute patent and/or copyright infringement suits against third parties with respect to infringement of any of the Patents and/or any copyrights related to this Agreement. In the event of any such suit under this Section 10.2, involving any of the Patents or any copyrights, Logan agrees, if requested by Company, to join as a party plaintiff, with all costs, attorneys' fees, and expenses to be paid by Company.

10.3 In association with any suit described in Section 10.2, Logan shall: execute promptly any legal papers that may be submitted to it by Company relating to such suit; furnish to Company promptly upon request such information as is at its disposal to assist Company in obtaining evidence; and otherwise generally cooperate with Company to the end that any litigation provided for under Section 10.2 may be brought to a successful conclusion. All reasonable out-of-pocket expenses incurred by Logan in rendering such assistance shall be paid by Company.

10.4 If Company decides not to initiate a lawsuit as set forth in Section 10.2, Logan shall have the second right (but not obligation) to initiate the same at Logan's own expense.

10.5 Any recovery of damages resulting from a lawsuit brought pursuant to Section 10.2 or 10.4 shall first be applied to cover all costs, attorney's fees, and expenses associated with the lawsuit, with any remainder being treated as Net Sales.

Section 11

**GENERAL**

11.1 All notices, payments, or deliveries called for by this Agreement shall be deemed sufficient upon actual delivery to the address set forth above or upon mailing by registered mail, return receipt requested.

11.2 Each party agrees to comply with all applicable laws and regulations of governmental bodies having jurisdiction over the subject matter of this Agreement.

11.3 Neither party shall be held liable to the other for failure of performance where such failure is caused solely by intervening conditions beyond that party's control, including acts of God, civil disturbance, strikes, labor disputes, and lawful governmental action. If any provision of this Agreement shall be deemed to be unlawful or unenforceable by a court of competent jurisdiction, such termination shall have no effect on the validity and enforceability of the other terms and conditions of this Agreement, and the challenged term shall be deemed deleted.

11.4 This Agreement constitutes the entire agreement between the parties and supersedes all prior statements, representations, and agreements on this subject matter. This Agreement may be amended only by a writing that refers to this Agreement and that is signed by both parties.

11.5 Company may assign or sublicense any or all of its rights under this Agreement without the written consent of Logan to a third party assignee or sublicensee. Company shall provide Logan written notice of the same within ninety (90) days of such assignment or sublicense. This Agreement and all of the rights and obligations hereunder shall inure to the benefit of and shall be binding upon sublicensees, subsidiaries, affiliates, successors, or assignees of Company.

11.6 This Agreement is made in accordance with, and shall be governed by, the laws of the State of Indiana without reference to its conflicts of law provisions. The parties consent to Indiana state court jurisdiction and venue which shall be the exclusive forum to resolve any dispute regarding or arising out of this Agreement; each party hereby waives any objections it may have to jurisdiction and venue of these courts over its person.

11.7 This Agreement has been prepared jointly and shall not be strictly construed against either party.

11.8 This Agreement may be executed in counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. A facsimile copy of a signature hereto shall be fully effective as if an original.

IN WITNESS WHEREOF, the parties have caused this Agreement to be duly executed by their authorized representatives below as of the date first written above.

Brent Logan

By: Brent Logan

Title: Division, President

Date: July 25, 2007

The BabyPlus Company

By: John H. Garrett

Title: President

Date: 7/24/07

**EXHIBIT A**

**TRADEMARK ASSIGNMENT**

WHEREAS, Brent Logan (hereinafter "Assignor"), a resident of the State of Washington with offices at 1004 Daley Street, Edmonds, WA 98020, is the owner of U.S. trademark registration number 2,449,736 for the mark BABYPLUS (hereinafter, the "Trademark");

WHEREAS, The BabyPlus Company (hereinafter "Assignee"), an Indiana Limited Liability Company with offices at 9750 Olympia Drive, Fishers, IN 46037, is desirous of acquiring the entire right, title, and interest in the Trademark, along with the good will of the business associated with and symbolized by the Trademark;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Assignor hereby assigns and transfers to Assignee, the entire right, title and interest in and to the Trademark, including the goodwill of the business associated with and symbolized by the Trademark, along with the right to recover for past, present and future infringements thereof, including without limitation, damages and profits.

IN TESTIMONY WHEREOF, I hereunto set my hand as of the date indicated below.

BRENT LOGAN.

By: Brent Logan  
Name: Brent Logan  
Date: July 25, 2007

ACCEPTED AND AGREED:

The BabyPlus Company

By Lisa Jarrett  
Name: Lisa Jarrett  
Title: President  
Date: 7/24/07

# EXHIBIT E



June 10, 2009

Karl R. Hermanns  
 (206) 694-4834  
 karlh@seedip.com

*By Express Mail*

EV889161975US

Seed Intellectual Property Law Group PLLC

Ms. Lisa Jarrett, President  
 The BabyPlus Company LLC  
 11725 Sea Star Drive  
 Indianapolis, IN 46256

Re: Notice of Breach of Agreement with Dr. Logan  
 Our reference: 610039.001

Dear Ms. Jarrett:

My law firm represents Dr. Brent Logan with regard to intellectual property matters.

**Address:** 701 Fifth Avenue  
 Suite 5400  
 Seattle, WA 98104  
**Telephone:** 206.622.4900  
**Fax:** 206.682.6031  
**Website:** SeedIP.com

In July of 2007, Dr. Logan and The BabyPlus Company ("the Company") executed a First Amended License and Assignment Agreement ("the Agreement"). Pursuant to Section 8.3, either party may terminate the Agreement for material breach by the other party that continues, without waiver or cure, for ninety (90) days after written notice to the other party.

By this letter, we hereby provide written notice of material breach on the part of the Company. As set forth in greater detail below, material breach is based on non-payment by the Company of the Minimum Royalties due under the Agreement, as well as failure on the part of the Company to provide information concerning payment of Sales Royalties. Absent cure, the Agreement will be terminated with all rights granted thereunder reverting to Dr. Logan, including re-assignment of the BabyPlus trademark.

With regard to Minimum Royalties due under the Agreement, the Company is obligated to make the payments set forth in Section 4.2 (due on the 1<sup>st</sup> and 15<sup>th</sup> of each month). As summarized in the following table, the Company has failed to satisfy its obligations under this section by making payments late and, more recently, by non-payment.

Amount	Due Date	Date Received
\$3470.17	10/15/08	11/10/08
\$3470.17	11/1/08	11/25/08
\$3470.17	11/15/08	12/19/08
\$3470.17	12/1/08	1/12/09
\$3470.17	12/15/08	2/6/09
\$3671.44	1/1/09	3/9/09
\$3671.44	1/15/09	4/10/09
\$3671.44	2/1/09	5/15/09
\$3671.44	2/15/09	6/9/09
\$3671.44	3/1/09	UNPAID
\$3671.44	3/15/09	UNPAID
\$3671.44	4/1/09	UNPAID

Ms. Lisa Jarrett  
 June 10, 2009  
 Page 2

610039.001

Amount	Due Date	Date Received
\$3671.44	4/15/09	UNPAID
\$3671.44	5/1/09	UNPAID
\$3671.44	5/15/09	UNPAID
\$3671.44	6/1/09	UNPAID
	<b>TOTAL</b>	<b>\$25,700.08</b>

Under Section 4.5, all past due amounts bear interest at a rate per annum equal to 3% in excess of the Prime Rate published in the Wall Street Journal. Interest was not paid on the Minimum Royalty amounts that were paid late, and will be due on past due amounts.

In addition to Minimum Royalties, the Company is obligated to make payment of Sales Royalties as set forth in Section 4.3 of the Agreement. Such amounts are due within thirty (30) days after the end of the calendar year. If the Sales Royalties do not exceed the Minimum Royalty due, the Company is required to provide notice of non-payment accompanied with a Summary Report (i.e., a report that summarizes by type all transactions producing revenue and any corresponding deductions for the calculation of net sales for the prior calendar year). The notice of non-payment accompanied by a Summary Report for 2008 sales (due January 30, 2009) has not been provided by the Company.

Please let me know how you wish to proceed.

Very truly yours,  
 Seed IP Law Group PLLC

  
 Karl R. Hermanns

cc: Brent Logan, Ph.D.

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# **EXHIBIT F**



PREGNATAL EDUCATION SYSTEM  
*When learning begins*

**WBENC** Women's Business Enterprise  
National Council

Creating Opportunities. Recognizing Excellence.

We are proud to announce our membership in the WBENC.

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**Education Systems**



### BabyPlus Prenatal Education System (includes one Comfort Pouch)

Our price: \$149.00

Quantity

[Add to Cart](#) [Add to wish list](#)



[See details](#)



[See details](#)

### Comfort Pouch

Extra comfort pouch for the BabyPlus Education System.

Our price: \$8.95

Quantity

[Add to Cart](#) [Add to wish list](#)

**The Essential Pregnancy Organizer  
featuring BabyPlus®**



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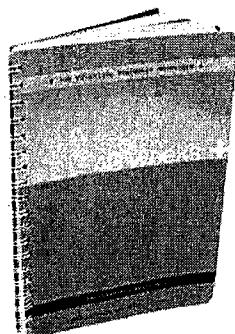
Call 1-800-330-6944  
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**COMPLAINT**  
**EXHIBIT F--Page 1 of 3**



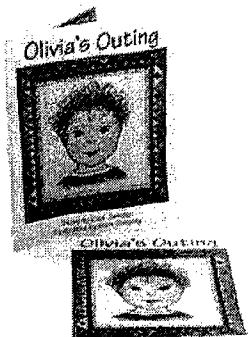
[See details](#)

Not Available for Sale. Complimentary  
\$20 Value. Shipping Charges Apply.  
COUPON REQUIRED.

To receive a complimentary copy from  
BabyPlus®, please see coupon code in the  
current issue of Pregnancy Magazine.

**Our price: \$20.00**

Quantity



[See details](#)

#### **Olivia's Outing**

Written by the founder of BabyPlus,  
Olivia's Outing is a charming story  
celebrating the simple pleasures of life  
through the eyes of an adventurous child.

The rhythm and rhyme of this beautifully  
illustrated book captures readers, young  
and old.

**Our price: \$9.95**

Quantity



[See details](#)

#### **Logo Onesie**

Your baby is **Born to learn.**™ Show your  
enthusiasm for prenatal learning with this  
cute Onesie embroidered with BabyPlus  
Logo.

**Our price: \$11.99**

#### **Bib**

**COMPLAINT**  
**EXHIBIT F--Page 2 of 3**



See details

Your baby is **Born to Learn™** with this adorable terry cloth bib with Velcro closures. Perfect for feeding time and for droolers.

**Our price: \$5.95**

Quantity



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**COMPLAINT  
EXHIBIT F--Page 3 of 3**